Coal Age

A McGRAW-HILL PUBLICATION

MARCH, 1948

HANDLING DISPUTES... p. 58

Getting his bearings right

SUN MINE LUBRICANT...

Cuts Bearing Replacements 25% in Mine, Cuts Lubrication Costs 40%

The cars in a well-known Pennsylvania mine were being lubricated by a special high-priced oil, but results were not entirely satisfactory.

A Sun Engineer was called in and recommended a Sun Mine Car Bearing Grease that had proved itself in dozens of mines where conditions were similar.

With this new grease on the job far better lubrication was obtained. Bearing seat replacements were reduced 25% and lubrication costs went down 40%.

For every type of mine-machine from loaders on the deepest seam right up to your hoists and powerhouse equipment, there are "Job Proved" Sun lubricants that will help you to produce more for less. Get your bearings right . . . call your nearest Sun office, or write Department CA-3.

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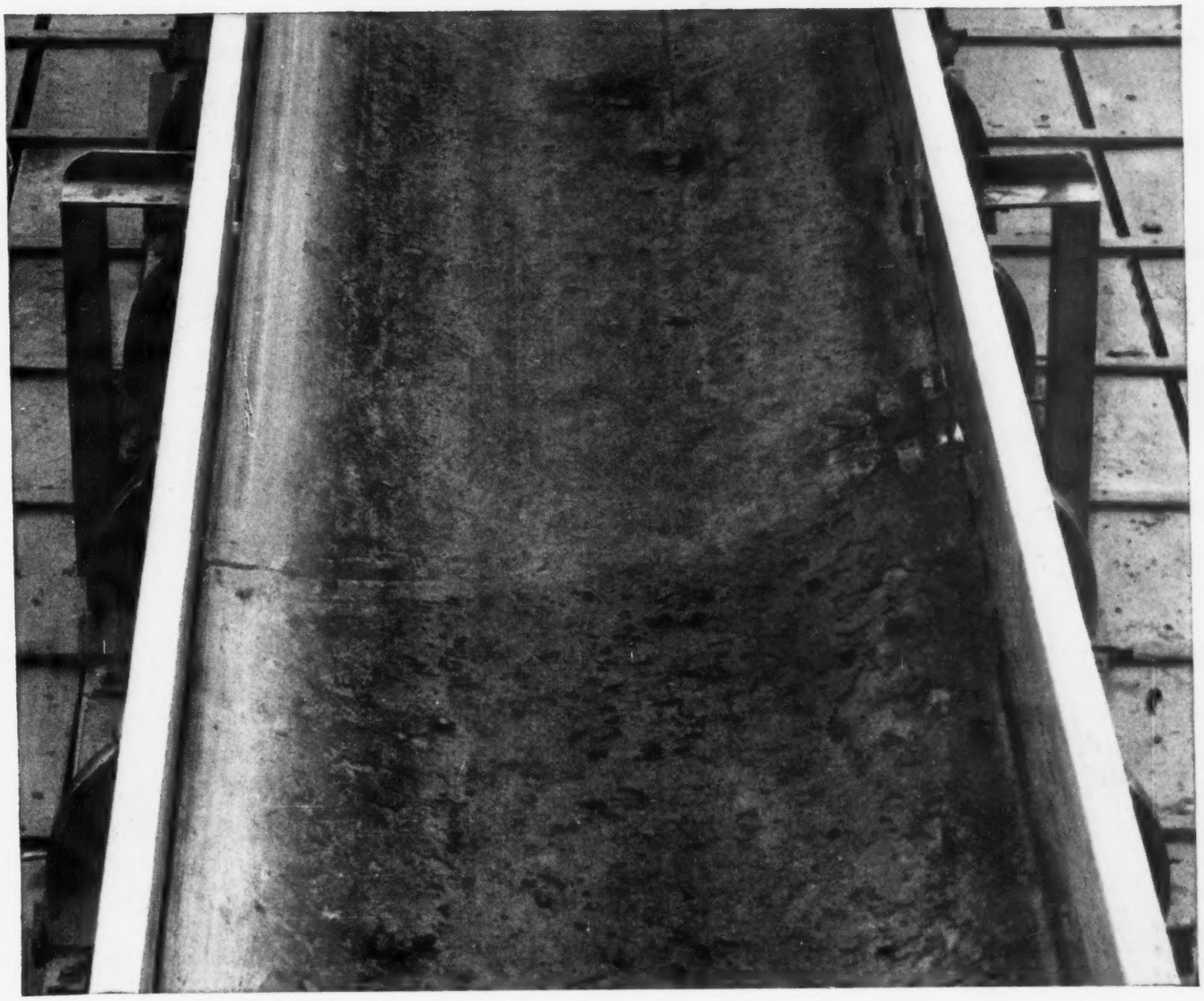

Can you guess which belt section lasted 2½ times longer?

A typical example of B. F. Goodrich product development

ONE section of the conveyor belt in this picture has dumped 1,000,000 tons of rock into San Francisco Bay to make a breakwater for the Navy. When the original B. F. Goodrich belt installed here had carried 600,000 tons of rock, an operating accident cut up a 100-ft. section of the belt.

Because it happened to be on hand, a belt of another make was spliced in with the remainder of the B. F. Goodrich belt and the rock conveyor put back to work. At the time this picture was taken the B. F. Goodrich section of the belt had hauled 1,000,000 tons; the other belt 400,000 tons. Can you tell which is which?

Actually, the top is the veteran B. F. Goodrich section, the bottom is the other belt. Notice the damage the latter has sustained, under the same service conditions as the top section. Yet after 2½ times as much use, the B. F. Goodrich section of belt is still in better condition.

Tougher cord construction and a tougher, thicker cover won this battle of the belts. The unique cord construction of the B. F. Goodrich belt was adopted after years of experiment had proved that cords riding in rubber give the maximum shock cushion, and make ply separation practically impossible. The compound of the belt cover was accepted as right only after many other formulae had been tested and rejected.

Whether it's belting, hose, or other industrial products, B. F. Goodrich regards the excellence of today's product as just a starting point for improvements tomorrow. This spirit of forward-looking research has resulted in tremendous advances in rubber engineering. Without obligation, ask to see their application to your plant problems. See your local distributor or write: *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

FIRST IN RUBBER

Make no mistake

FOR INSTANCE...

Are you mistaken about QUICKSAND?

Quicksand is popularly believed to "suck down" anything in it. In reality, quicksand has no more such action than plain water. A human being can "float" in quicksand just as easily as in water—it is the struggling to get out that causes trouble.

Slow-ups and stoppages of coal mining machinery originate from definite causes, too — and one outstanding cause is the WRONG KIND of lubricating grease. But when you bring HULBURT QUALITY GREASE into your mine — that ONE RIGHT grease of unmatched QUALITY made for just ONE purpose in ONE field — you get trouble-free, continuous machinery operation. You're making no mistake to talk things over with a Hulburt down-in-the-mine Lubrication Engineer about HULBURT QUALITY GREASE.

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Specialists in Coal Mine Lubrication

... for Coal Mine Lubrication

use

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PROVEN BY PERFORMANCE

Quality GREASE

with mining machine cable . . .

it pays to look "under the hood," too

Of course — the outside jacket of mining machine cables is of prime importance to long, trouble-free cable life. That's why we talk so much about the Hazaprene jacket — its flame resistance . . . sun, oil, water and acid resistance . . . the way it stands up so long in the toughest kind of service.

But what about the conductor insulation? With Hazacord you get the *extra* protection and service life provided by *Performite* heat resisting rubber insulation. This better grade insulation permits Hazacord to safely carry approximately 25% more current than cables made with ordinary Performance grade rubber insulation. Performite insulation has a temperature rating of 75°C. as against a 60°C. rating for Performance grade insulation.

And consider fillers in cable construction. Jute fillers can sometimes act like a wick — drawing trouble-making moisture into the cable interior. So when fillers are necessary, Hazard puts only Hazaprene fillers into Hazacord mining machine cables. Again it's *extra* assurance for you, that with Hazacord carrying the load you have reduced the chances of trouble from this part of your job to a minimum. Get all the facts from the Hazard Mining Catalog. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

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Coal Age

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World News Offices: London, Paris, Berlin, Moscow, Tokyo, Bombay, Melbourne, Rio de Janeiro, Buenos Aires

A McGRAW-HILL PUBLICATION

COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. Allow at least ten days for change of address.
Subscription rates: United States and possessions, $5 for one year, $8 for two years, $10 for three years. Canada, $6 for one year, $10 for two years, $12 for three years. Pan American countries, $6 for one year, $10 for two years, $12 for three years. All other countries, $15 for one year, $30 for three years. Single copies, 50 cents each. Entered as second class matter April 22, 1947, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. Printed in the U. S. A. Cable Address: "McGraw-Hill N. Y." Member A.B.P. Member A.B.C. Please indicate position and company connection on all subscription orders.

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Publication office, 210 South Desplaines St., Chicago, Ill. Editorial and executive offices, 330 W. 42nd St., New York 18, N. Y. Branch offices: 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, Aldwych, London, W.C. 2; Washington, 4; Philadelphia, 3; Cleveland, 15; Detroit, 26; St. Louis, 1; Boston, 16; Atlanta, 3; Los Angeles, 14; 738-9 Oliver Bldg., Pittsburgh, 22.

All communications about subscriptions should be addressed to the Director of Circulation, Coal Age, 210 South Desplaines St., Chicago, Ill., or 330 West 42nd St., New York 18, N. Y.

District Managers: T. E. Alcorn and F. W. Roets, New York; W. A. Potter, Philadelphia; W. M. Spears, Cleveland; H. C. Chellson, Pittsburgh; C. J. Coash, G. A. Mack, Chicago.

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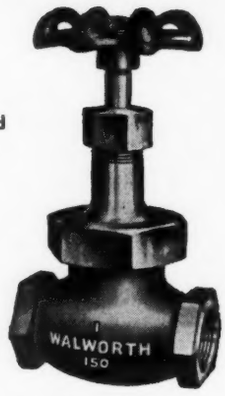

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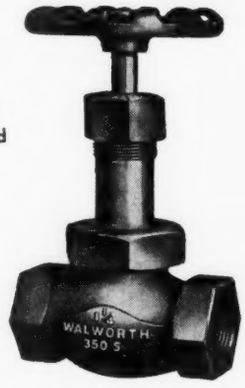

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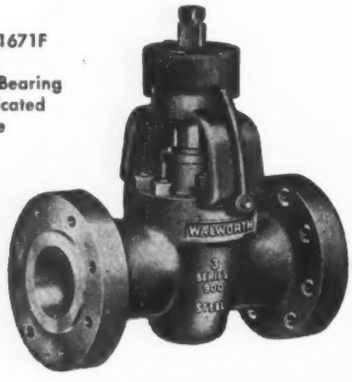

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Steel
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No. 726F
Iron Body
Wedge
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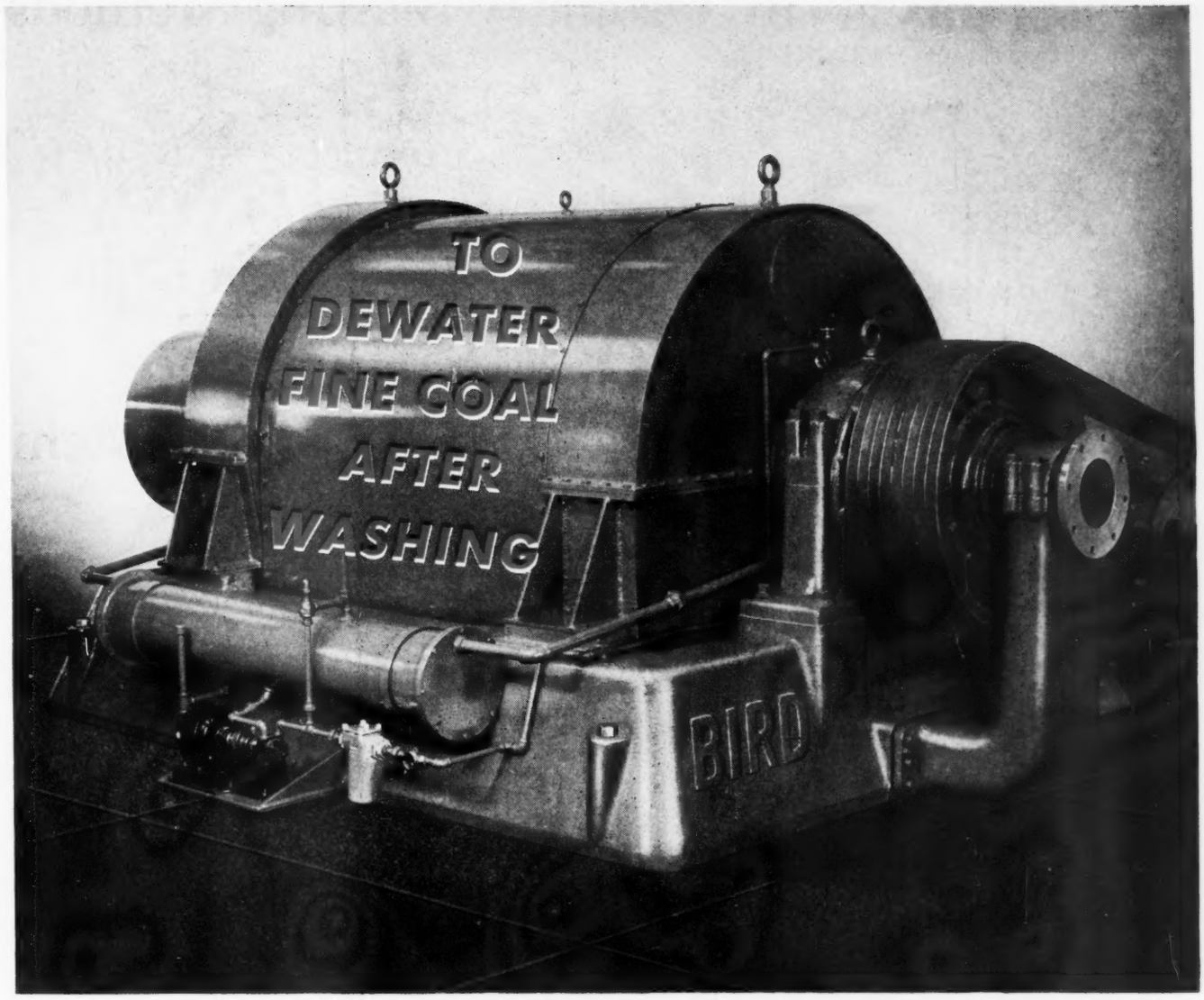
Valve



...this BIRD Continuous Centrifugal Filter is your best bet

It takes the fine coal just as it comes from tables or launders without using drag tanks or other settling devices.

It gets the water out so clean that it can be used over and over. It contains less than 5% solids in a closed circuited plant with the water returning directly to the head tank.

It gets the coal so dry it's all ready for blending—from 6 to 10% moisture depending on the quantity of fines in the feed.

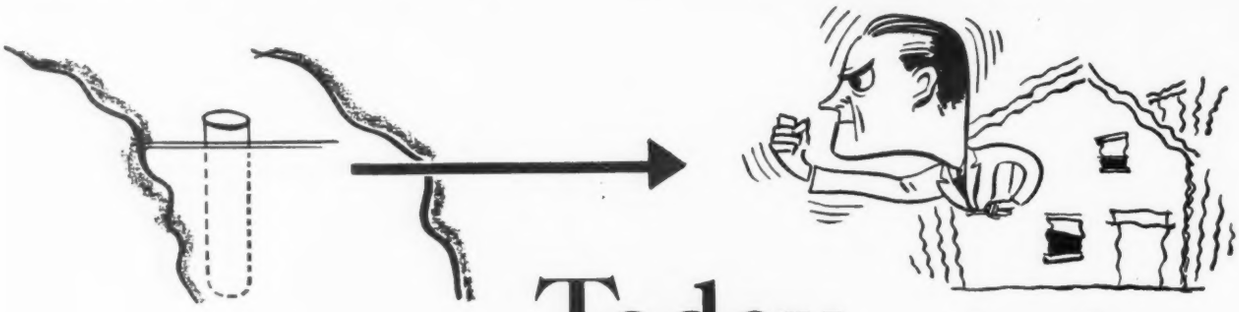
It handles forty tons or more per hour and *stays on the job* steadily for long periods without parts replacements.

Let us tell you more about the BIRD and what it can do to save you money.

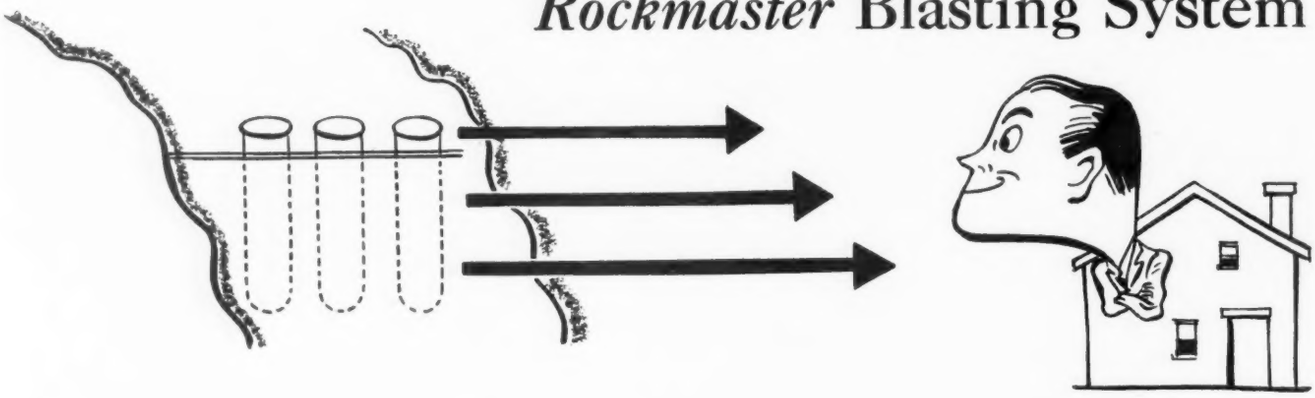
BIRD MACHINE COMPANY, South Walpole, Massachusetts

The BIRD Centrifugal FILTER

Yesterday... by Ordinary Blasting Methods



Today ... by the *Rockmaster* Blasting System



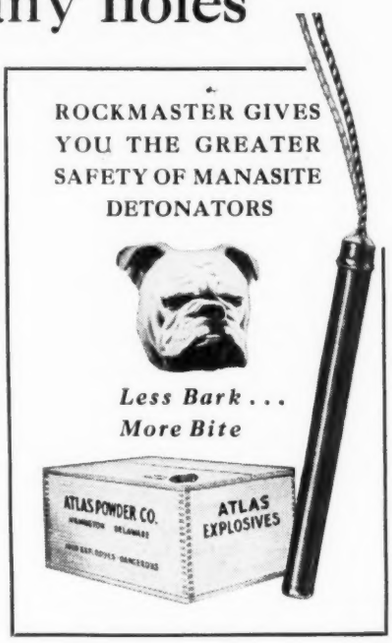
"We shot over three times as many holes and received no complaints!"

A big limestone quarry received so many complaints about noise and vibration that they were forced to cut way down on the number of holes they could fire by standard methods. Costs per ton of rock went soaring.

Then they called in Rockmaster—and quickly found that with the Rockmaster system they could fire over three times as many holes with approximately four times as much dynamite without receiving complaints. And this is not an isolated case, by any means.

This fact alone is important to quarries, construction jobs and coal stripping operations, but there is more to it than the mere silencing of complaints. The Rockmaster system gives better fragmentation, far less "back-break" in quarries and less pulverizing of coal in strip pits. It frequently happens that the Rockmaster system permits a wider spacing of drill holes with a saving of drilling and explosives cost, too.

Call in the Atlas representative today. He will be glad to give you the benefit of Atlas pioneering in milli-second delay blasting.



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How to get BIG YARDAGE *at Lower Cost!*

MAUMEE COLLIERIES OPERATION—Here the HD-19 with Baker bulldozer levels a roadway for a 25 cu. yd. dragline on the operation of Maumee Collieries Company, Jasonville, Indiana. The 19 is also used by this company for numerous other jobs, including clearing roadways for blast hole drills.

Let this rugged, tough, Allis-Chalmers HD-19 tractor strip off the top overburden . . . save your big, costly draglines and shovels for removal of shale, rock, boney and similar strata. This way you will be making the most efficient use of each machine . . . result will be lowest possible cost per yard.

Also use the fast-working, smooth-operating HD-19 for cleaning-up around strippers and for pushing material within their reach; for leveling roadbeds for them to move over and work on . . . for cleaning roadways for blast hole drills . . . for pulling heavy equipment . . . building roads . . . or as a stripping unit in its own right, working with bulldozers and scrapers.

Whatever the job—this world's largest, most powerful tractor will get it done at less cost to you.

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BUILT TO GET MORE WORK DONE

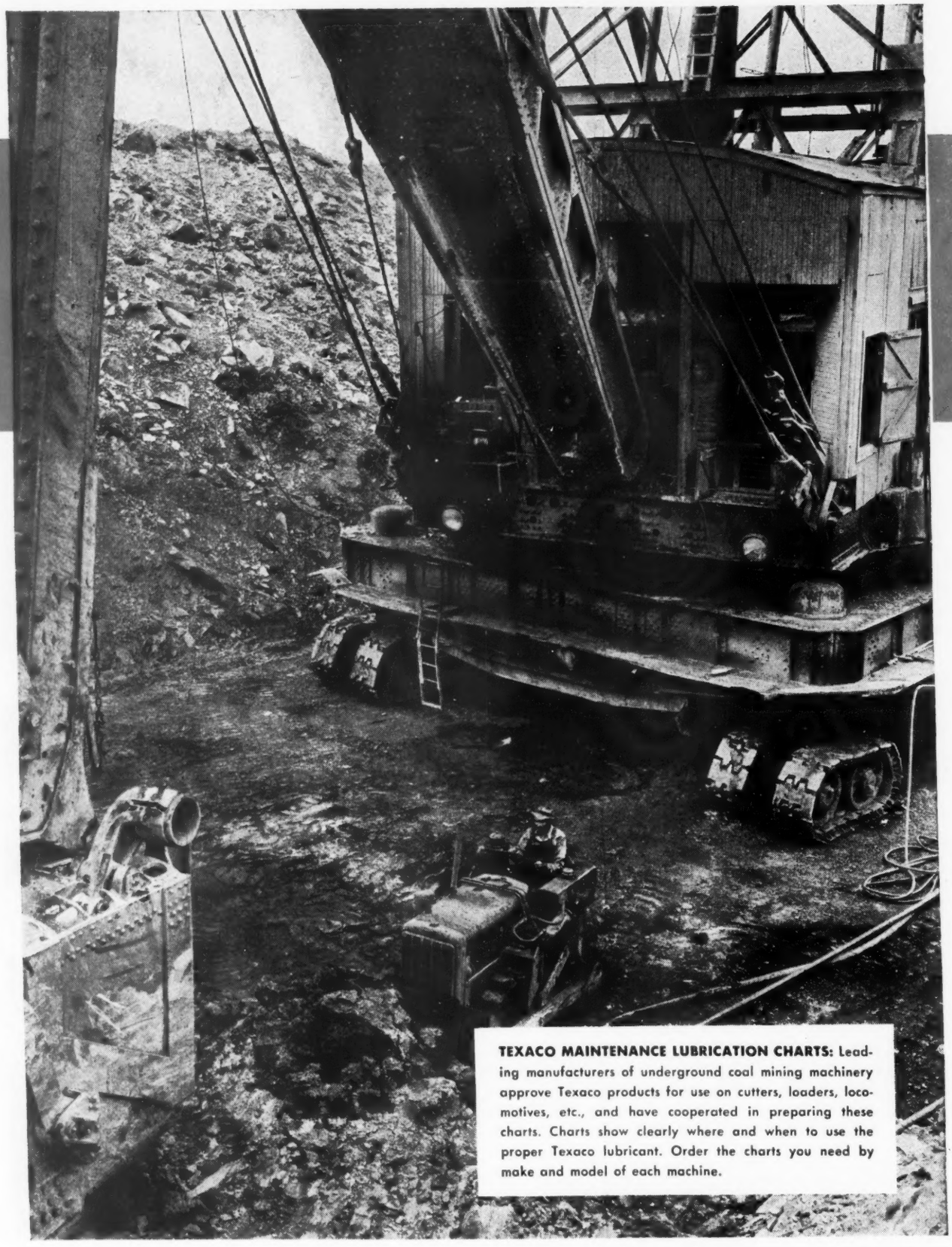
- Weight: 40,000 pounds.
- Power: 2-Cycle General Motors Diesel — 163 hp. at flywheel.
- Torque converter automatically balances load and speed without gear-shifting.
- Speeds: 0 to 3.0 in low gear and 0 to 7.0 in high; reverse, 0 to 5.5.
- More traction, more ground contact, better balance.

BUILT TO LAST LONGER WITH LESS UPKEEP

- Torque converter smooths tractor performance—cushions engine and transmission from shock loads.
- Simplified maintenance — major assemblies conveniently serviced or removed. Operating adjustments easily reached, quickly made.
- Reduced lubrication — greasing intervals lengthened throughout . . . 1,000 hours on truck wheels, support rollers, front idlers.
- High clearance—over 16 inches.

BUILT FOR EASIER CONTROL & GREATER OPERATOR COMFORT

- Torque converter eliminates most shifting.
- Hydraulic, finger-tip steering.
- Convenient controls.
- Self-energizing brakes.
- New type, adjustable split seat.
- Wide arm rests.
- Adjustable brake pedals.
- Full visibility.
- Comfortable foot rests.
- Clean platform.



TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

Tune in . . .
TEXACO STAR THEATER
presents the
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See newspaper for
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A Texaco Lubrication Engineer will gladly give you complete details and assist you in improving the performance of all your machinery through effective lubrication. Just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C*, 135 E. 42nd St., New York 17, N. Y.

For the Coal Mining Industry

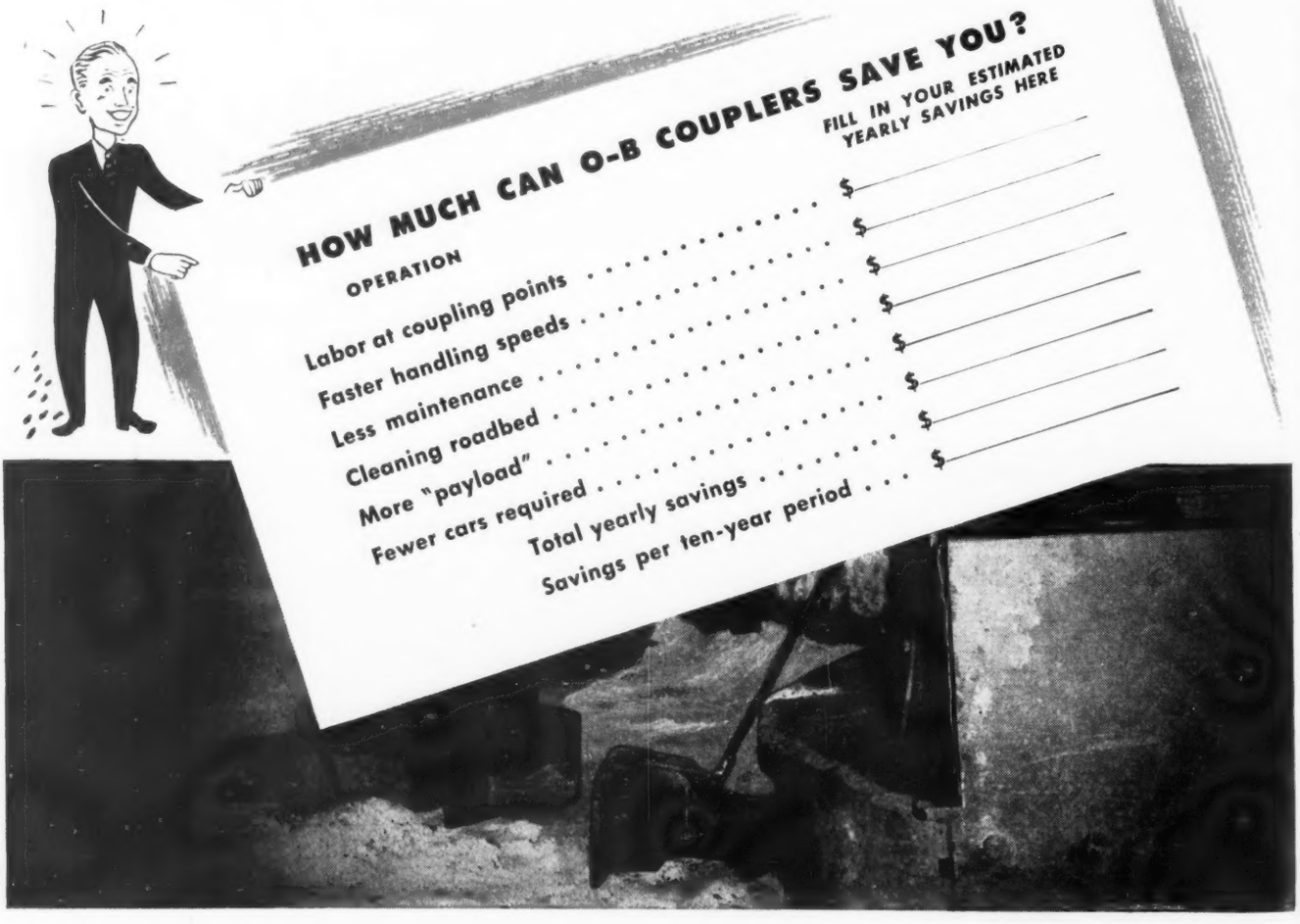
ADD UP

See for yourself how much money O-B Automatic Couplers can save in your own haulage operation . . .

Far from being an additional expenditure, the purchase of O-B Automatic Couplers can actually save you money in the operation of your haulage system—money that can easily amoritize part of the cost of your haulage equipment in addition to paying for the couplers themselves. For an understanding of the reasons why, study the six important cost-saving features discussed on these pages.

Since conditions vary from mine to mine, no attempt has been made to evaluate the savings of each feature. Only you, with your knowledge of your own operation, can properly determine how much couplers will actually save you. In going over the six features, make an estimate of the amount each can save you annually. Add up the savings in the convenient check chart. See for yourself what an O-B Automatic Coupler operation can mean to you.

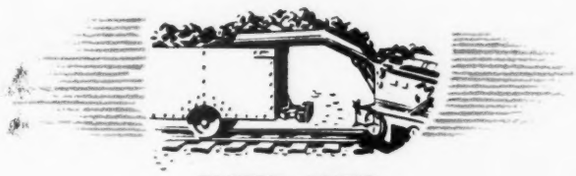
With today's labor-economic conditions, these savings become doubly important. Make it a point to investigate O-B Automatic Couplers before you purchase your next mine cars. Your O-B representative will be glad to discuss couplers with you in complete detail.



THE SAVINGS!

LABOR AT COUPLING POINTS

Coupling is entirely an automatic operation. Two cars come together and couple without manual assistance. In some mines, the motorman alone can handle the cars at all loading and gathering points. In others, he can be assisted by one of the loading crew. One minute saved per car on 500 individual car handlings adds up to more than 8 hours per day. The same reasoning applies to car handling at shaft-bottom dumps and tipple switchbacks.

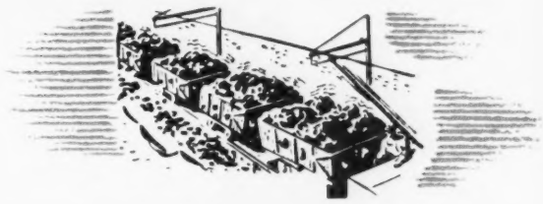


FASTER SPEED

Coupler-equipped cars can be handled faster requiring less time per car-change under the loader. This utilizes the loader to better advantage and should enable your loading crew to produce more per man-hour.

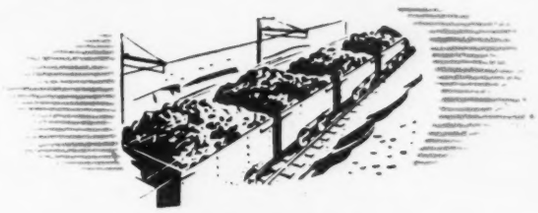
LESS MAINTENANCE

A sturdy rubber draft gear capable of absorbing impact blows up to 100,000 pounds (depending upon the type of coupler used) will eliminate a lot of wear and tear on your cars. O-B Form-8 Couplers also impart added track stability to the car, keeping it on the track and preventing expensive derailments. Wheel flange wear is lessened.



CLEANER ROADBED

Cars equipped with old-fashioned links and pins bounce and jolt on their road to the tipple, often spilling considerable coal enroute. Mines using automatic couplers soon discover that cars ride more smoothly and spillage is eliminated. Estimate how long it takes to remove and recover this coal from your roadbed and multiply by the number of times this cleaning operation must be made each year.



MORE PAYLOAD

Because cars ride more smoothly, maximum carrying capacity of the car can be utilized. Often this amounts to 200 pounds or more of coal in each car.

FEWER CARS REQUIRED

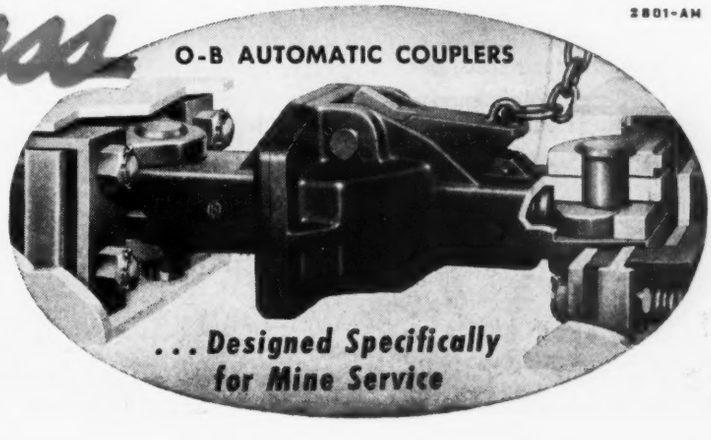
Mines using automatic couplers usually find that fewer cars are required to haul the same daily tonnage. Coupler-equipped cars seem to get around quicker and make more round trips per day. A saving of ten percent on this item is not unlikely.

Ohio Brass

2801-AM

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd.,
Niagara Falls, Ontario



THIS SOLIDS PUMP
Fights Wear!

TOUGHEST PUMP of its kind is the new Allis-Chalmers Solids Pump! Constructed of special abrasion-resistant alloy it will outlast ordinary pumps as much as 4 times. New, simple design has fewer working parts to wear out with all parts quickly and easily accessible. Low in initial cost and power requirement. Handles up to 40% solids. Seven sizes . . . 100 to 7000 gpm . . . heads through 100 feet.

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1. **Longer Pump Life** is insured by special abrasion-resistant alloy construction.
2. **Easy Accessibility** to all working parts cuts down time as much as 80%.
3. **Fewest Total Working Parts** to wear out reduces repair costs, parts inventory.
4. **Simpler Maintenance** . . . remove entire rotating element without disturbing piping.
5. **Quick, Easy Servicing** of stuffing box and inboard bearing adjusting nut.
6. **Interchangeable Parts** within different size pumps reduces parts inventory.
7. **Change Capacities Quickly,** up or down, without touching pump or pump parts by simply changing Texrope V-belt drive or drive and motor.
8. **Seven Discharge Positions** 45° apart without complicated piping arrangements.

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for quarry and mine work

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Big boss is the Hard Rock Lug—built with massive lugs for super-stamina on such murderous hauls as pit-to-crusher runs. Its running mate is the Road Lug—engineered for the dual job of hauling off AND on the road, as from stock-pile to delivery points.

Together they team up to beat down costs on *any* rock haul. Both are built with super-strong rayon cord and extra-heavy treads. Each rolls on a tread specially designed for long service in spite of severe going. And each is a long-life, low-cost performer that will do your work better and longer.

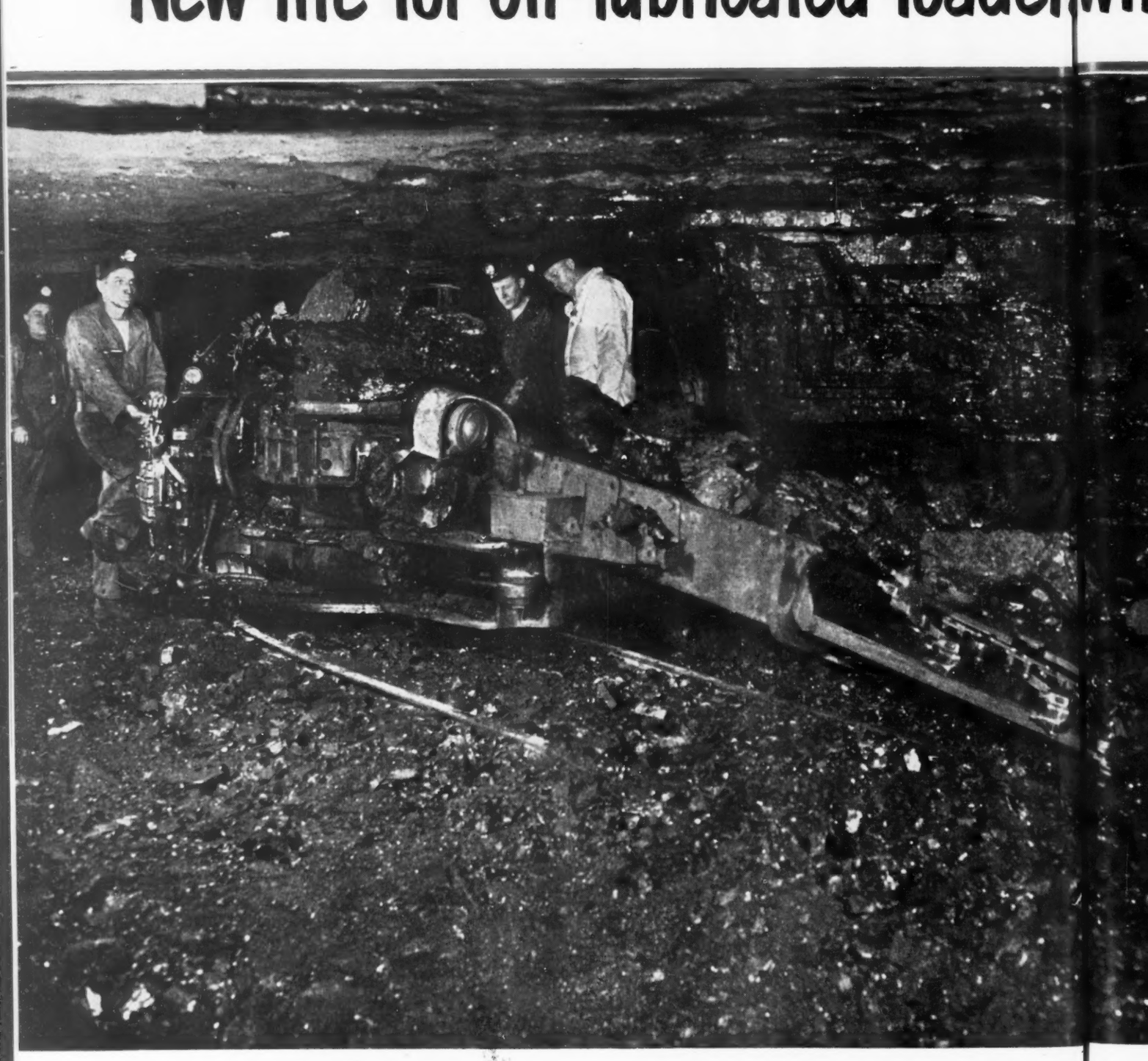
You'll find it pays off big in hard-cash savings to equip with the one that best fits your needs. Ask your Goodyear man for his recommendations.

GOODYEAR

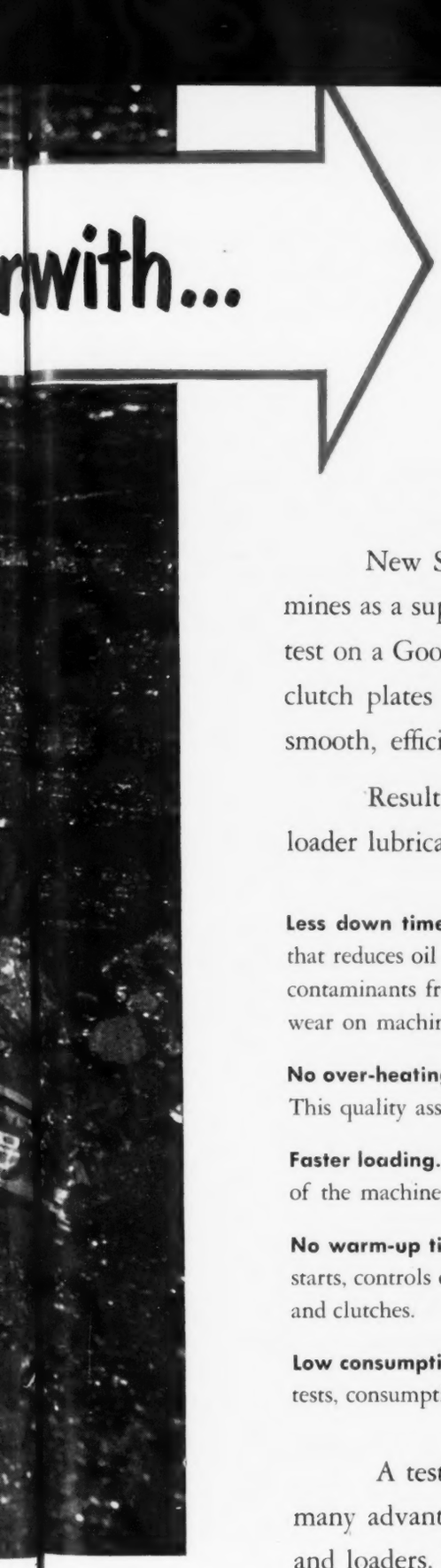
MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Road Lug—T. M. The Goodyear Tire & Rubber Company

New life for oil-lubricated loader wit



STANDARD OIL COMPANY (INDIANA) STA



SUPERLA Mine Lubricant No. 0

New Superla Mine Lubricant No. 0 has fast established itself in Midwest mines as a superior lubricant for oil-lubricated loaders and cutters. In one 6-month test on a Goodman No. 360 loader, Superla Mine Lubricant No. 0 kept gears and clutch plates unusually free from hard carbon and other deposits. It maintained smooth, efficient loader action, contributing to high machine production.

Results obtained with this additive-type oil show five benefits of improved loader lubrication:

Less down time and maintenance. Superla Mine Lubricant No. 0 contains an oxidation inhibitor that reduces oil deterioration at high gear-case temperatures. A detergent additive keeps gear-case contaminants from settling out on clutch plates, gears and gear cases. Cleaner operation reduces wear on machine parts and down time for replacements.

No over-heating. Superla Mine Lubricant No. 0 does not thin out excessively at operating temperatures. This quality assures proper lubrication of machine parts during long periods of continuous service.

Faster loading. Clean clutch plates permit smooth operation of controls. This allows easier handling of the machine, results in faster loading, and reduces operator fatigue.

No warm-up time. Superla Mine Lubricant No. 0 is fluid at low temperatures. When the machine starts, controls operate freely. Wear is reduced because the lubricant flows readily to bearings, gears, and clutches.

Low consumption. Superla Mine Lubricant No. 0 is a closely fractionated oil. In actual mine-loader tests, consumption has been as low as 25% of that obtained with conventional motor oil.

A test of new Superla Mine Lubricants in your equipment will prove their many advantages. Grades are available for both grease- and oil-lubricated cutters and loaders. The Standard Oil Lubrication Engineer in your Midwest locality will help you make a test. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

A STANDARD OIL COMPANY (INDIANA) STANDARD

Install it in 2 minutes . . . without tools

BOWDIL *Quick Action* ROPE SOCKET

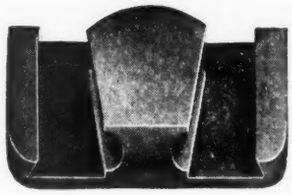
THE BOWDIL Rope Socket was designed to make quick rope replacement without tools. It can be installed anywhere in two minutes. To install it, it is merely necessary to position the rope, place the cap in position and go to work. The tension on the rope tightens the wedge-shaped cap and the greater the tension the tighter it holds. To replace broken cable, it is only necessary to drive the cap back, releasing the grip on the rope. The heavy dove-tailed cap is easily removed with a few sharp blows of the hammer and has ample body for striking.

The Bowdil Rope Socket reduces the danger of mashed, scratched or punctured fingers, common causes of delays and infections. Special hook clamp on the eye end permits instant connection to any point on a long guide line without injury to the rope.

The offset eye design gives greater protection to the rope as the pull is straight out from the socket.

The Bowdil Rope Socket is forged from high-tensile alloy steel, heat treated for maximum strength, thus permitting the use of lighter, less-bulky parts.

Bowdil Rope Sockets are made to accommodate rope of various sizes from ½" to 1". Inquiries for special application are welcomed.



Part No.	
704	. . . . ½" Rope Socket
706	. . . . ⅝" Rope Socket
707	. . . . ¾" Rope Socket
708	. . . . 1" Rope Socket

BOWDIL CANTON, OHIO

Reg. U. S. Pat. Off.

This photo shows a typical installation of a Jeffrey Type 8H117 "AERODYNE"
prominent mine in Pennsylvania. Also available are Jeffrey "AERODYNE" Junior
and general ventilation up to 4" pressure, and for Industrial ap

WHEREVER COAL IS MINED YOU'LL FIND SOME TY

of a Jeffrey Type 8H117 "AERODYNE" Fan used to ventilate a
ailable are Jeffrey "AERODYNE" Junior fans for auxiliary service
p to 4" pressure, and for Industrial applications.

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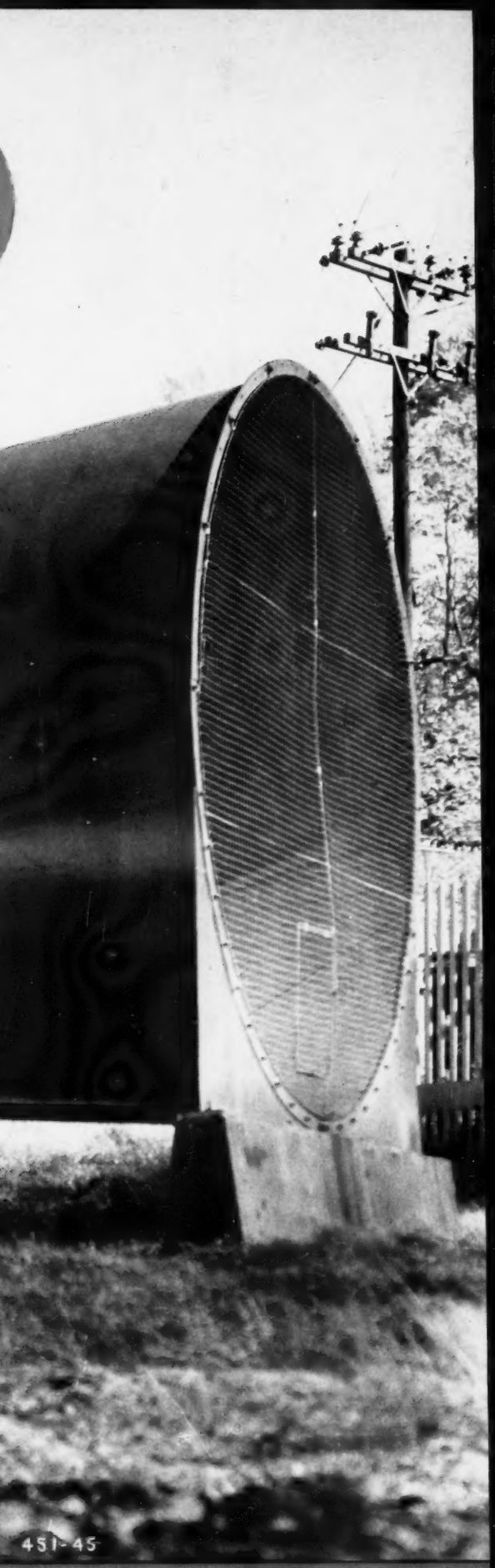
LL FIND SOME TYPE OF *JEFFREY* E



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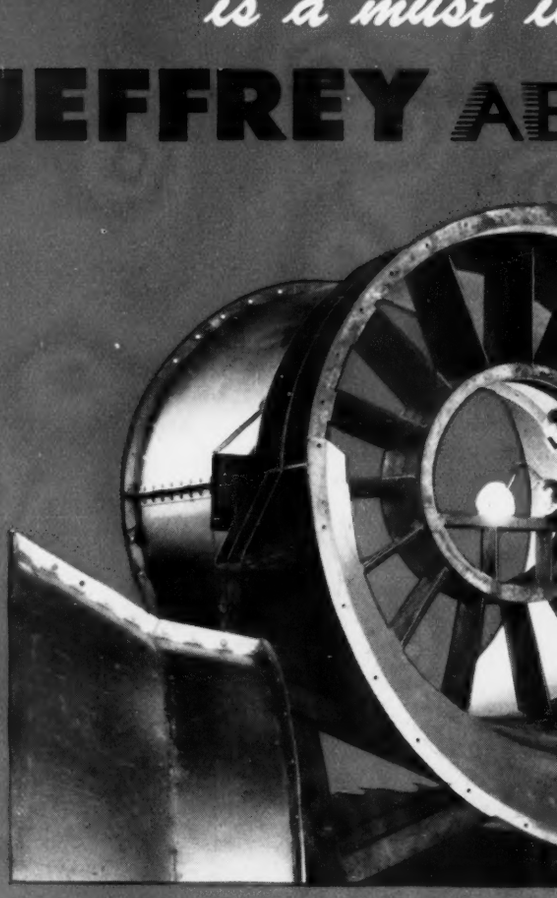
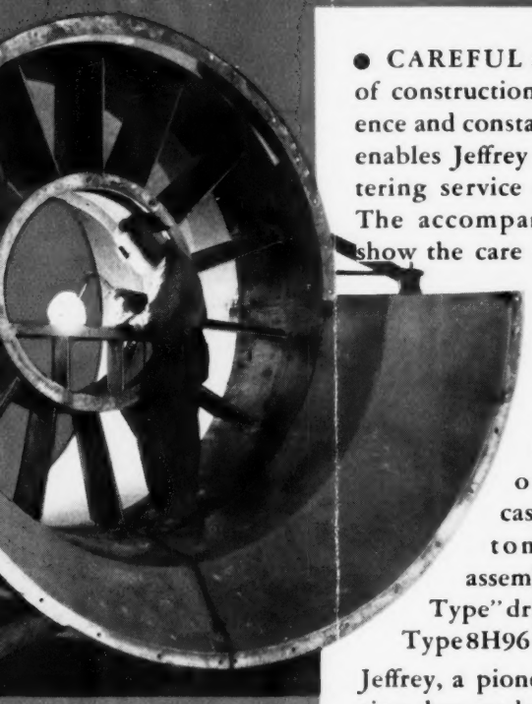


rendable air supply
ust" in modern mining

AERODYNE FANS

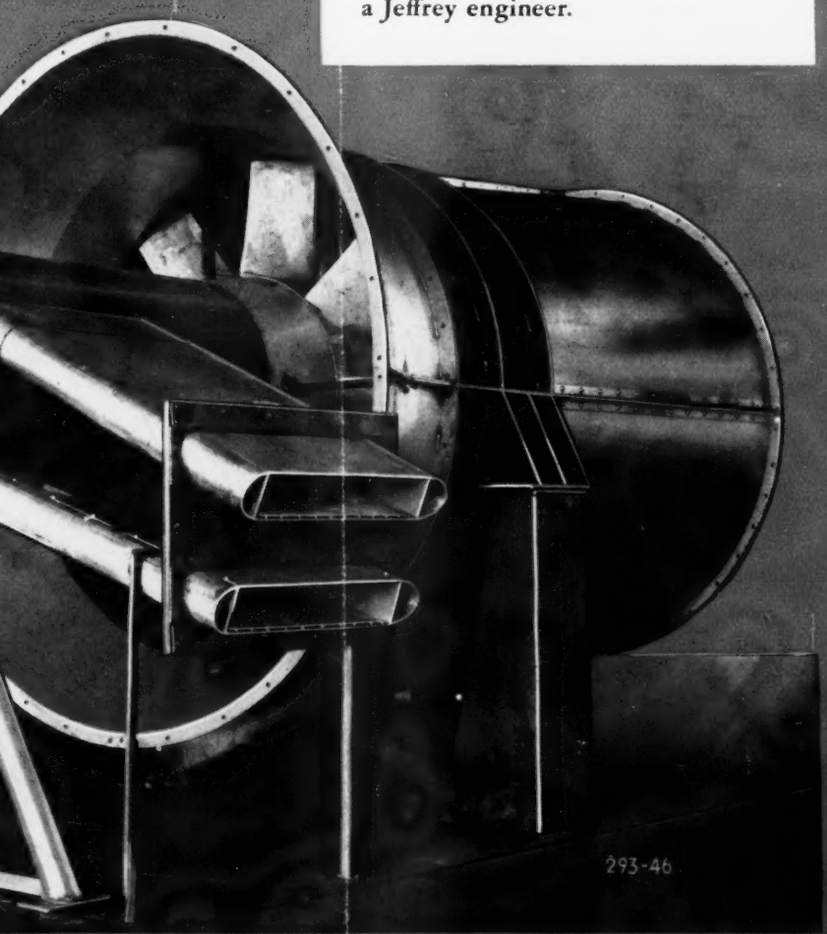
(Reg. U. S. Pat. Off.)



● CAREFUL attention to details of construction . . . long experience and constant development . . . enables Jeffrey fans to give unfaltering service over long periods. The accompanying photographs show the care and precision practiced in providing equipment for the proper coursing of air through a mine.

At the left is shown a welding operation on a section of the casing . . . at the bottom may be seen an assembly of the "Torpedo Type" drive cover on a Jeffrey Type 8H96 "AERODYNE" Fan.

Jeffrey, a pioneer in mine ventilation, has made a real contribution to mine operation. For details on the correct ventilation of your property it will pay you to consult a Jeffrey engineer.



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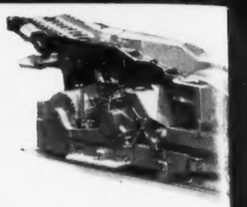
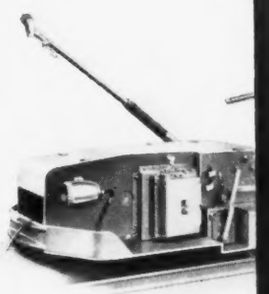


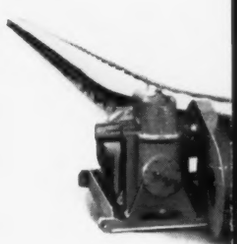
LOADING MACHIN



DRILLS AND
DRILLING MACHI

UNIVERSAL
COAL CUTTERS

SHORTWALL COAL



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Sales Offices:

Service Stations:

Foreign Plants:

FANS

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At the left is shown
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LOADING MACHINES

CONVEYOR-LOADERS

JEFFREY EQUIPMENT FOR COAL MINES

DRILLS AND DRILLING MACHINES

TROLLEY AND STORAGE BATTERY LOCOMOTIVES

UNIVERSAL COAL CUTTERS

FANS AND BLOWERS

SHORTWALL COAL CUTTERS

SHUTTLE CARS

CHAIN AND BELT TYPE CONVEYORS

AND GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Jacksonville, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

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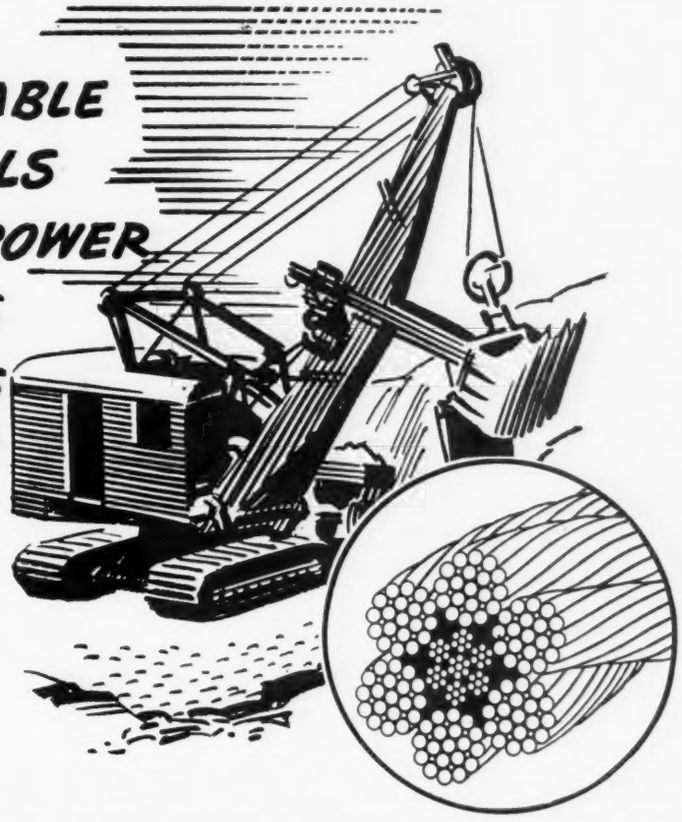
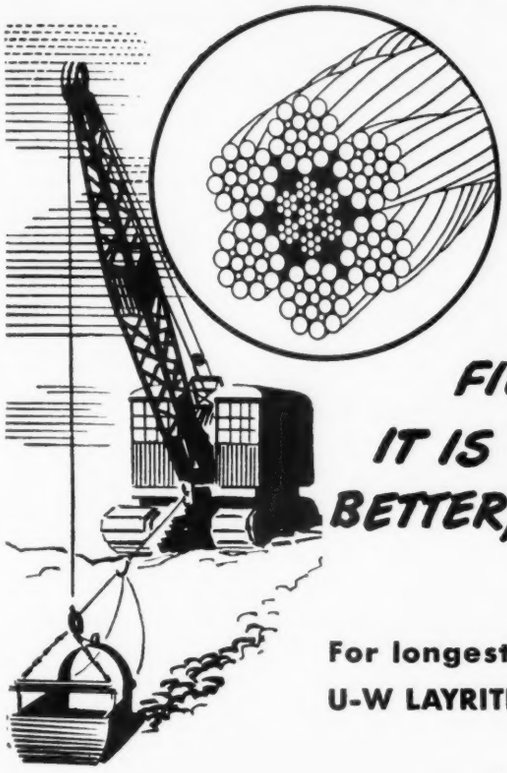
SOME ROPES FOOL YOU

U-W 6×19 FILLER WIRE CABLE IS IDEAL FOR BOOM FALLS AND HOIST ROPES ON POWER SHOVELS BECAUSE IT IS FLEXIBLE AND RESISTS FATIGUE AND ABRASION

BUT...

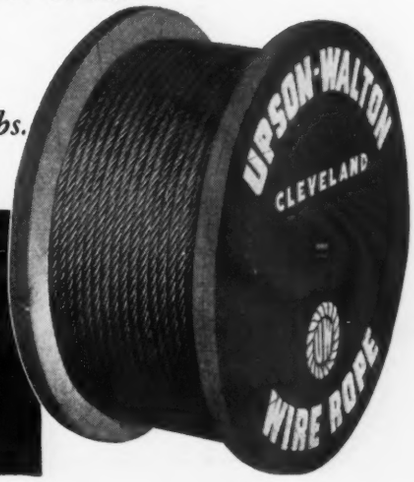




FOR DRAG CABLES ON DRAG LINE EXCAVATORS, U-W 6×16 FILLER WIRE IS BETTER BECAUSE IT IS COARSE AND RESISTS ABRASION BETTER, YET IS SUFFICIENTLY FLEXIBLE

For longest and best service, always specify U-W LAYRITE (*Preformed*) IMPROVED PLOW STEEL

We invite you to let UPSON-WALTON engineer your tough rope jobs.



Copyright 1947—The Upson-Walton Company

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

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Sumping

Along the face

GOODMAN MANUFACTURING COMPANY

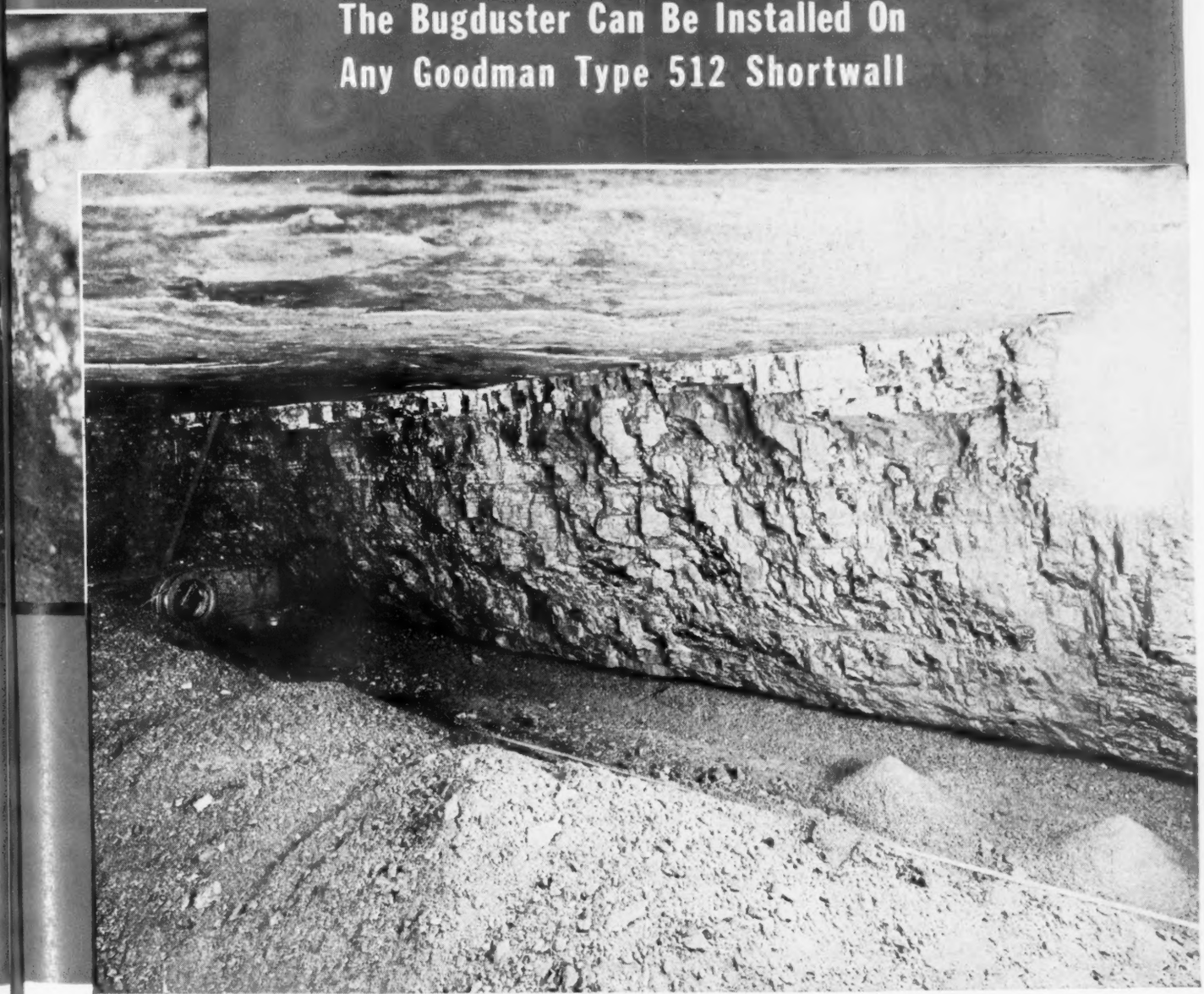
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

SHOVELING DAYS ARE OVER

When the Goodman Bugduster Is Put to Work

- A dust hazard is eliminated.
- The kerf is left clean.
- Cuttings are piled in a single row back from the face and away from the direction of cutting.

The Bugduster Can Be Installed On Any Goodman Type 512 Shortwall



3 BIG ADVANTAGES OF HAULING WITH WALTER TRACTOR TRUCKS

- Above: 300 hp. Walter Tractor Truck with 30 ton bottom dump trailer.
- Below: 200 hp. Walter Tractor Truck with 20 cu. yd., 20 ton dump body.

1. MORE TONS.

In open-pit coal and iron mines, Walter Tractor Trucks are hauling 30, 40, up to 60 ton payloads. These huge loads are hauled at speeds equalling smaller trucks. Each trip delivers much greater tonnage per truck, therefore fewer trucks are needed to keep plant at capacity.

2. MORE WORKING DAYS.

Walter Tractor Trucks continue hauling when all other units are stalled by difficult terrain. The great 4-wheel traction and power of the Walter 4-Point Positive Drive hauls unfailingly under any running or weather conditions. There is no bogging down on soft or slippery surfaces and grades.

3. LESS WEAR ON TIRES AND ROADS.

Three automatic locking differentials in Walter Tractor Trucks eliminate wheel-spinning, therefore prevent grinding of tire treads and churning of mine roads. The Suspended Double Reduction Drive greatly reduces unsprung weight, thus cuts down bouncing, pounding and scuffing of tires and roads. Mines are unanimous in reports of substantial tire savings.

WRITE for detailed literature giving more information on these and many other valuable features of Walter Tractor Trucks.

WALTER TRACTOR TRUCKS

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

a ***must*** *in modern mining:*

unfailing light

at the working place

EDISON ELECTRIC CAP LAMPS

The ever-increasing importance of *teamwork* in today's mining puts heavy emphasis on the *dependability* of production equipment, particularly the miner's personal cap lamp.

Light must not fail, for any member of a working group, if full production is to be maintained.

The EDISON Electric Cap Lamp provides unrivalled dependability for the wearer—unfailing, brilliantly effective light at the working place throughout the entire shift—and holds a more than thirty-year record of sterling performance. May we show you in a practical demonstration the reasons-why?

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.

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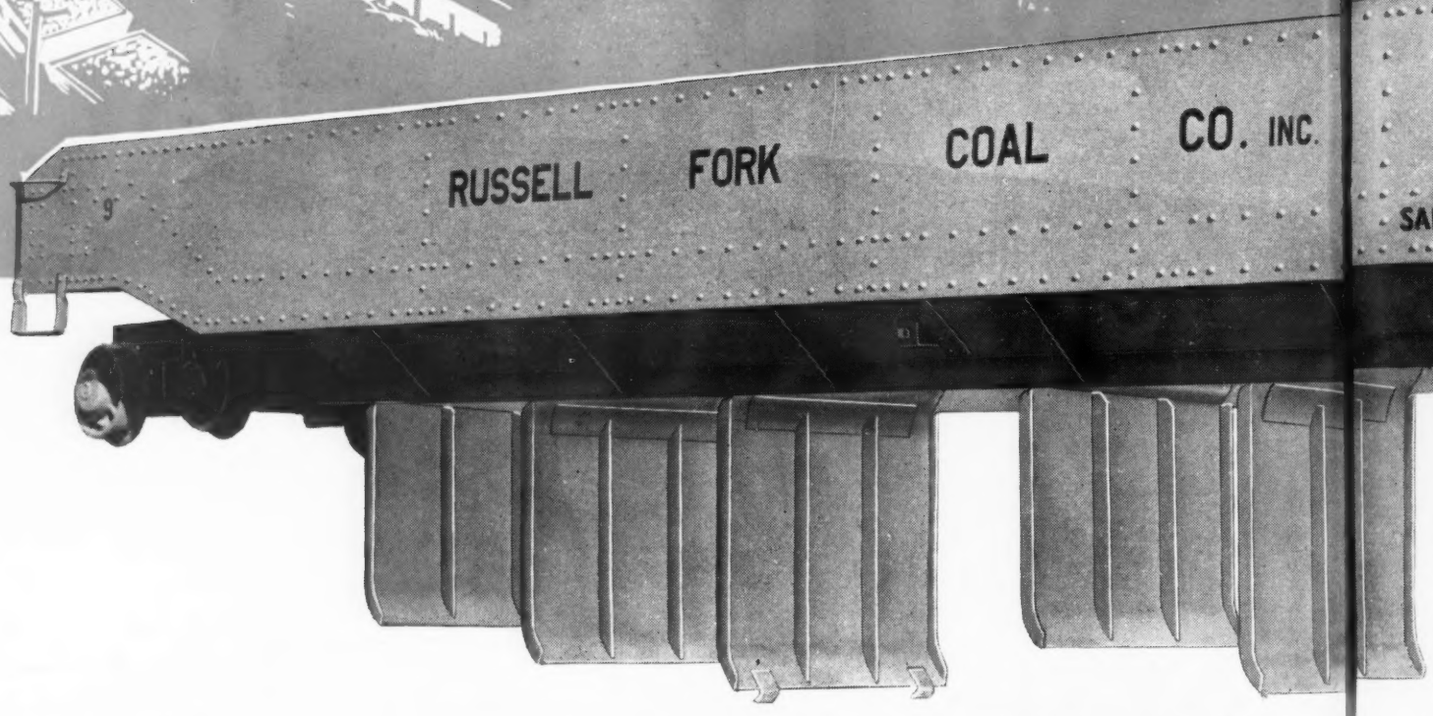
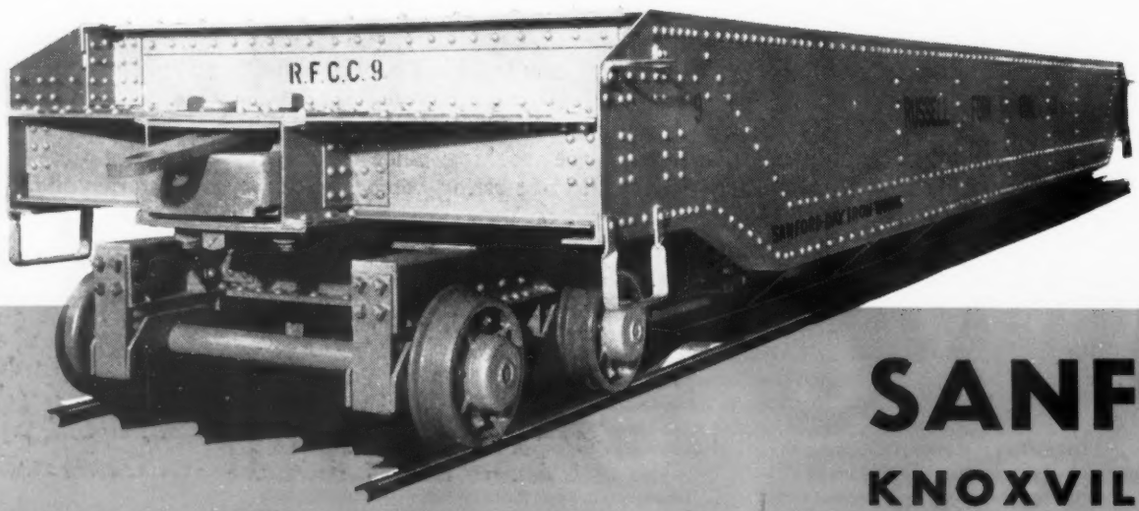
Another "FIRST" By SANFORD-DAY...



60 Thousand Pounds of Coal PER CAR

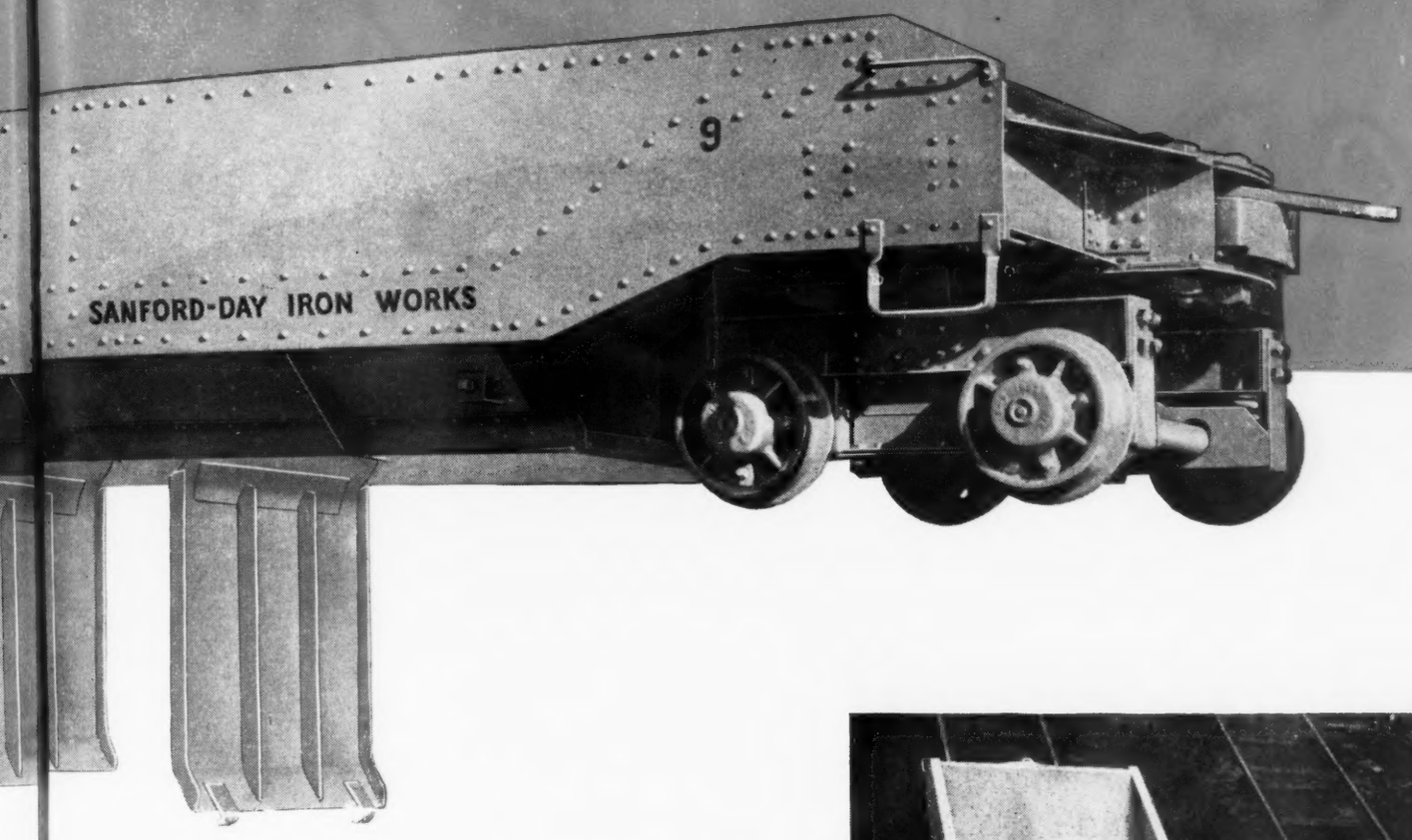
This is the largest automatic bottom-dumping car ever built for conventional coal mine use. It is one of the cars designed and built for the Russell Fork Coal Co. Its length is 39 ft. 8 in.; Width 8 ft.; Height 4 ft. 4 in. above track and, bear in mind, it rides on eight S-D "FLOATER" BALL BEARING DEMOUNTABLE WHEELS. THIRTY TONS OF COAL, including surcharge, pass through its six doors, almost instantly, when doors are tripped. The doors are provided with two sets of latch hooks—one set for each three doors. This *extraordinary safety feature* is made possible by our new improved "Jerk-out" latch and tripping device. The "Jerk-out" works entirely under the car with foolproof, *safe* operation.



SANFORD-

KNOXVILLE,

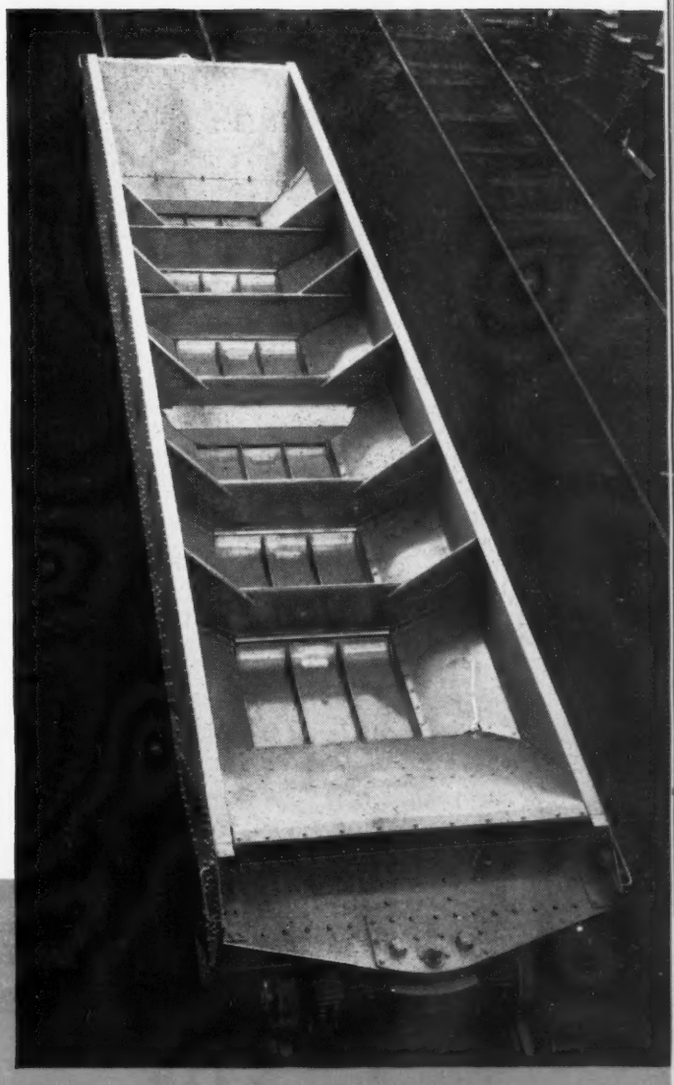
The Largest Automatic Bottom-Dumping Car Ever Built For Regular Coal Mine Use



Stop And Think—"Can Your Mine Use 30-Ton Cars?"

Increased production at the least possible cost is vital today. This is a well known fact you already know. Not every mine, of course, can use a car of this capacity. However, many operators are overlooking the great economies offered by BIG S-D "Automatics". The trend is to larger cars. Many mines are seriously studying the possibility of using them. We will be glad to discuss the details with you without obligation.

If any change-over is planned in your mine, you will profit tremendously by changing over to the industry's most modern and efficient car—the S-D Automatic Bottom-Dumping Car . . . built to meet your particular requirements, large or small.



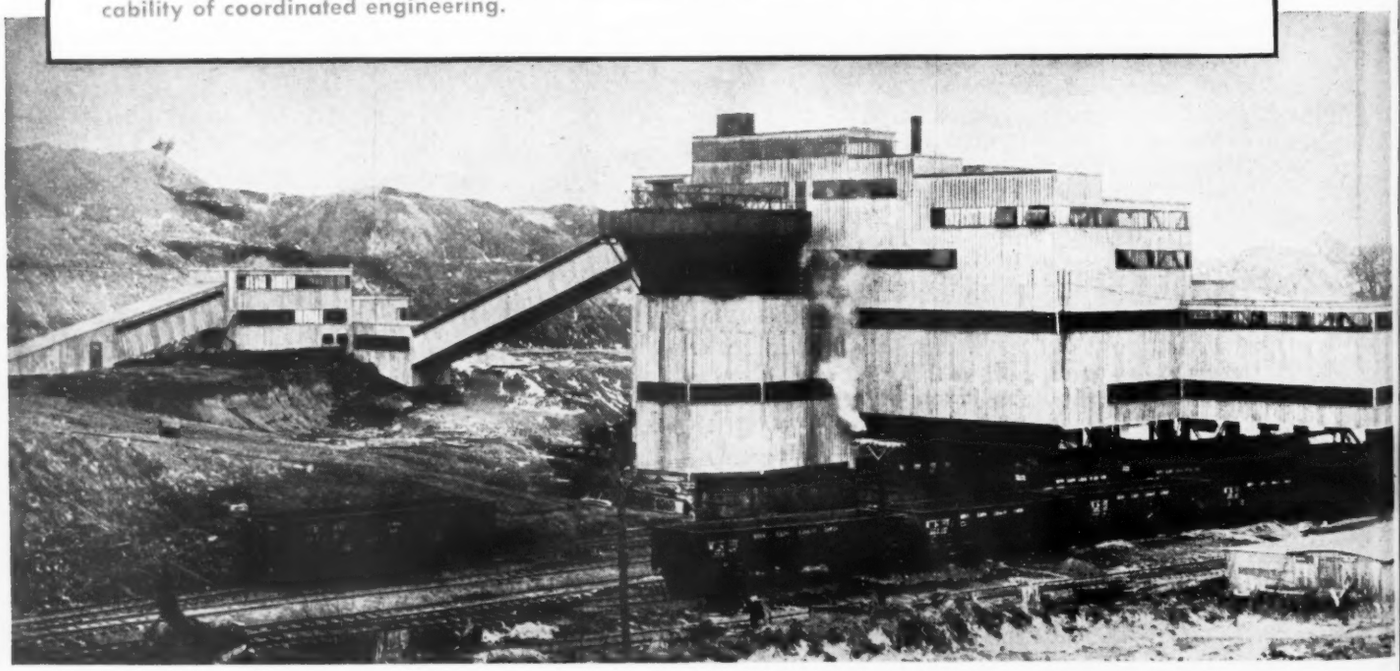
DAY Iron Works

TENNESSEE

FOR OVER SIX YEARS—a strenuous period for the coal industry—a smooth-flowing, low-cost-per-ton haulage system has contributed to the success of this strip-mine operation.

Millions of tons of coal have poured into an underground hopper, up out of the mine, through crusher and preparation plant and out into cars.

This system, using three U. S. Rubber conveyor belts, is but one of many examples of the practicability of coordinated engineering.



COST HAULAGE

can't help but result from coordinated engineering—teamwork between your mine engineer, your equipment engineer and the U. S. Rubber conveyor belt engineer. May we tell you more about this successful method of modern mechanization or about a replacement of your present belt?

Write Mechanical Goods Division, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

Underground belts as well as slopes and booms fit into the plan of coordinated three-way engineering, advocated by U. S. Rubber.

PRODUCT OF

U.S.RUBBER

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ANNOUNCING A 2
CAPACITY RATINGS C

**Makes possible the use of smaller bearings—
with savings in bearing cost, material cost and weight
—and more compact product design**

IN the ten years since the present load capacity ratings of Timken tapered roller bearings were established, Timken bearings have been steadily improved. Improved so much that today the load carrying capacity of Timken bearings is a good *25% greater* than it was 10 years ago!

As a result, The Timken Roller Bearing Company is now able to announce a 25% increase in the load capacity ratings of all Timken bearings —following a careful review of laboratory studies on fatigue life machines over the past ten years, together with close observation of bearing performance in the field.

Permits Use of Smaller Bearings

Now you can safely carry your present bearing loads on smaller size Timken bearings. Reductions in size of shafts and housings are possible. Products can be made more compact—lighter in weight. You have an opportunity to save both on bearing costs and material costs. And this increase in ratings should enable engineers to utilize the advantages of Timken bearings in an even broader variety of applications than has been practicable in the past.

Result of Constant Quality Improvement

This 25% increase in Timken bearing capacity ratings is based on continued improvement in the quality of Timken tapered roller bearings over the past 10 years. It is due to a number of factors, including improved alloy steels made in our own Timken steel mill specifically for anti-friction bearings, better metallurgical control in the processing of this steel, more accurate manufacturing equipment, greatly improved surface finishes, and more accurate inspection methods. That these improvements in Timken bearing quality have resulted in 25% greater load capacity has been conclusively demonstrated by years of exhaustive laboratory and field studies!

New Engineering Journal to Give Facts

A new Timken Engineering Journal is now in

25% INCREASE IN OF TIMKEN® BEARINGS

The result of years of constant improvement in Timken bearing quality—supported by exhaustive laboratory studies and extensive field experience

preparation which will give complete capacity rating tabulations and will also include new bearings introduced since the last publication. Pending publication of the new Journal you may take full advantage of the 25% capacity increase by multiplying the existing ratings by 1.25.

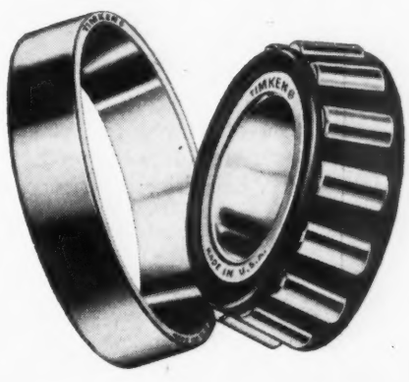
For further assistance in the application of Timken bearings, call upon our field engineers or our Engineering Department.

Timken tapered roller bearings take any combination of radial and thrust loads, hold shafts in rigid alignment, assure precision and minimize friction. The 25% increase in load capacity ratings is the *latest* example of Timken leadership in serving the bearing needs of all industry . . . one more reason why it pays to look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

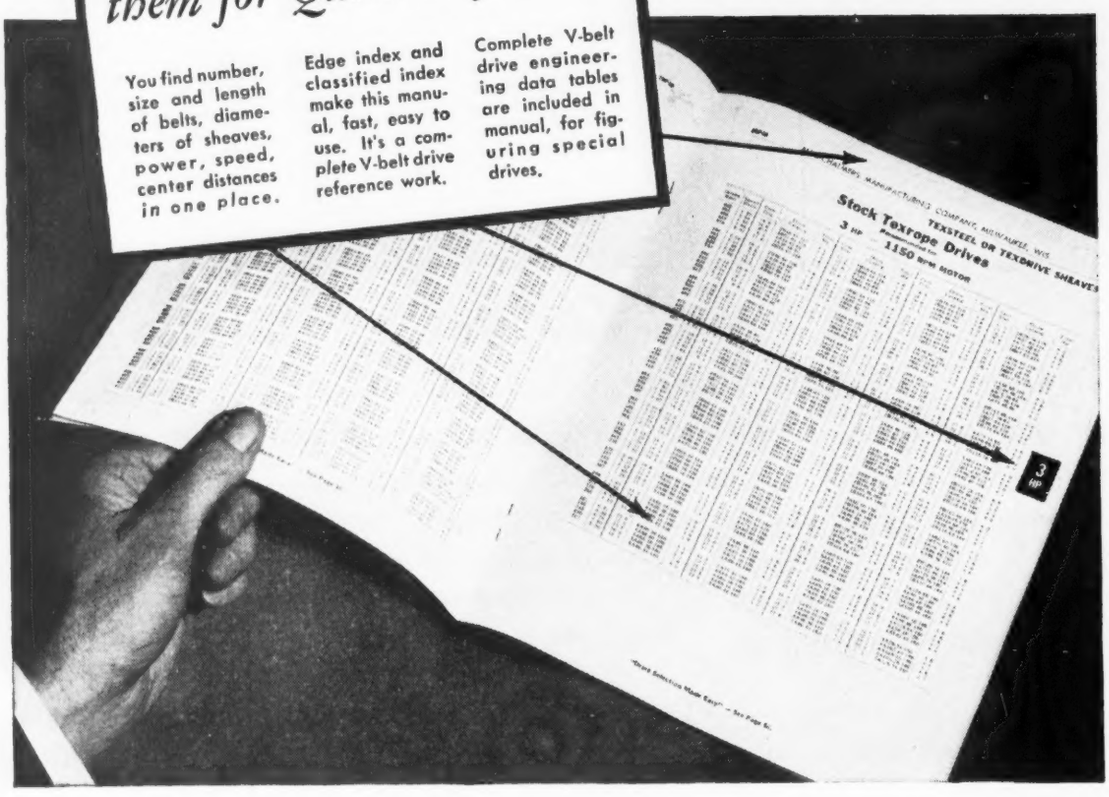


NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊂⊃ AND THRUST ⊣⊢ LOADS OR ANY COMBINATION

90% OF ALL V-BELT DRIVE PROBLEMS SOLVED ECONOMICALLY WITH TEXROPE

Pre-Engineered Drives

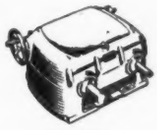
TEXROPE .. Greatest Name in V-Belt Drives


This New Manual Lists them for Quick Reference
You find number, size and length of belts, diameters of sheaves, power, speed, center distances in one place.
Edge index and classified index make this manual, fast, easy to use. It's a complete V-belt drive reference work.
Complete V-belt drive engineering data tables are included in manual, for figuring special drives.
Stock Texrope Drives
TEXSTEEL OR TEXDRIVE SHEAVES
3 HP
1150 RPM MOTOR
3 HP

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

USING STOCK BELTS AND SHEAVES, Texrope engineers have selected the *best* drive for each requirement . . . the drive most economical in first cost and in maintenance.

Only Allis-Chalmers offers you this complete Pre-Engineered drive manual. It is the product of 23 years of industrial V-belt drive experience, the finest engineering talent in the business.

Here is a book that will save you time and money in the purchase of V-belt drive equipment. Copies have been sent to many Texrope users and dealers. If you don't have a copy yet, write for Texbook No. 20P40. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2335

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1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

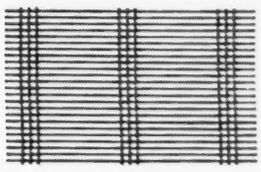
ROEFLAT aggregate wire screens

ALMOST ELEVEN MONTHS added *free* to every year of screen life...that's the extra dividend you get with ROEFLAT Aggregate Wire Screens! The new Roebling crimping method increases the flat wearing surface of screens by 75% . . . nearly doubles the wear . . . with no sacrifice of open area.

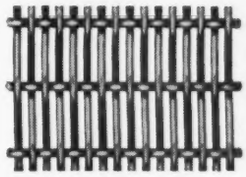
In addition, ROEFLAT'S level surface virtually eliminates blinding. Accurate size of openings gives you a uniform product and helps boost output. Importantly, too, improved quality steel adds greatly to the abrasion and fatigue resistance of all ROEFLAT screens.

ROEFLAT crimp is available in almost every type of wire screening. Write for Booklet W-903 giving full information.

TWO OTHER WAYS TO CUT SCREEN COSTS



ROESLOT



ROETON

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

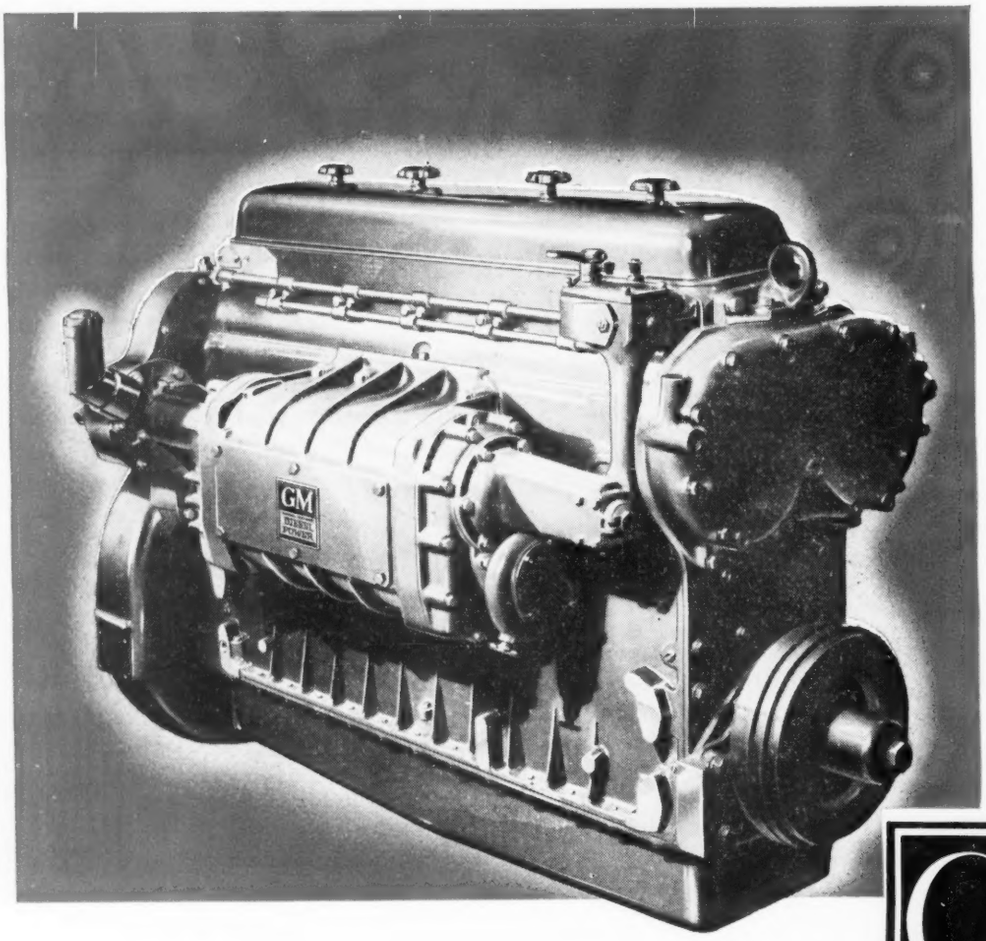
★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS ★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE ★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

ROEBLING

A CENTURY OF CONFIDENCE

JR ROEBLING

GOOD KEEP GOOD



DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES .. *Up to 200 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS .. *Up to 800 H.P.*

GENERAL MOTORS

GM
GENERAL MOTORS
DIESEL
POWER

DIESELS COMPANY

Every day more and more well-known manufacturers of contractors equipment and other machinery are offering the General Motors Series 71 2-cycle Diesel engine as power for their products.

The reason is clear. These tough, dependable Diesels provide great power in moderate space. They start easily—pick up their load fast—run smoothly and use a minimum of low cost fuel.

GM 2-cycle Diesels produce power at every piston downstroke. They are designed for easier servicing; have no high-pressure fuel lines and offer a maximum of interchangeability of parts, engine for engine.

These are the factors which, together with Detroit Diesel's owner service policy and warranty, have earned for GM Diesel its enviable reputation.

LEADING MANUFACTURERS OF THE FOLLOWING EQUIPMENT OFFER GM SERIES 71 DIESEL ENGINES IN THEIR PRODUCTS:

Air Compressors
Arc Welders
Asphalt Plants
Buses
Cableways
Cranes
Distillation Equipment
Ditchers
Draglines
Dredges
Earthmoving Loaders
Evaporation Units
Feed Mills
Fire Pumps
Hoists
Industrial Locomotives
Locomotive Cranes
Logging Loaders
Logging Yarders
Mining Pumps
Motor Graders
Off-The-Road Vehicles
Oil Field Equipment
Pavers
Power Scrapers
Pumps
Road Rollers
Rock Crushers
Rotary Soil Tillers
Saw Mills
Screening Plants
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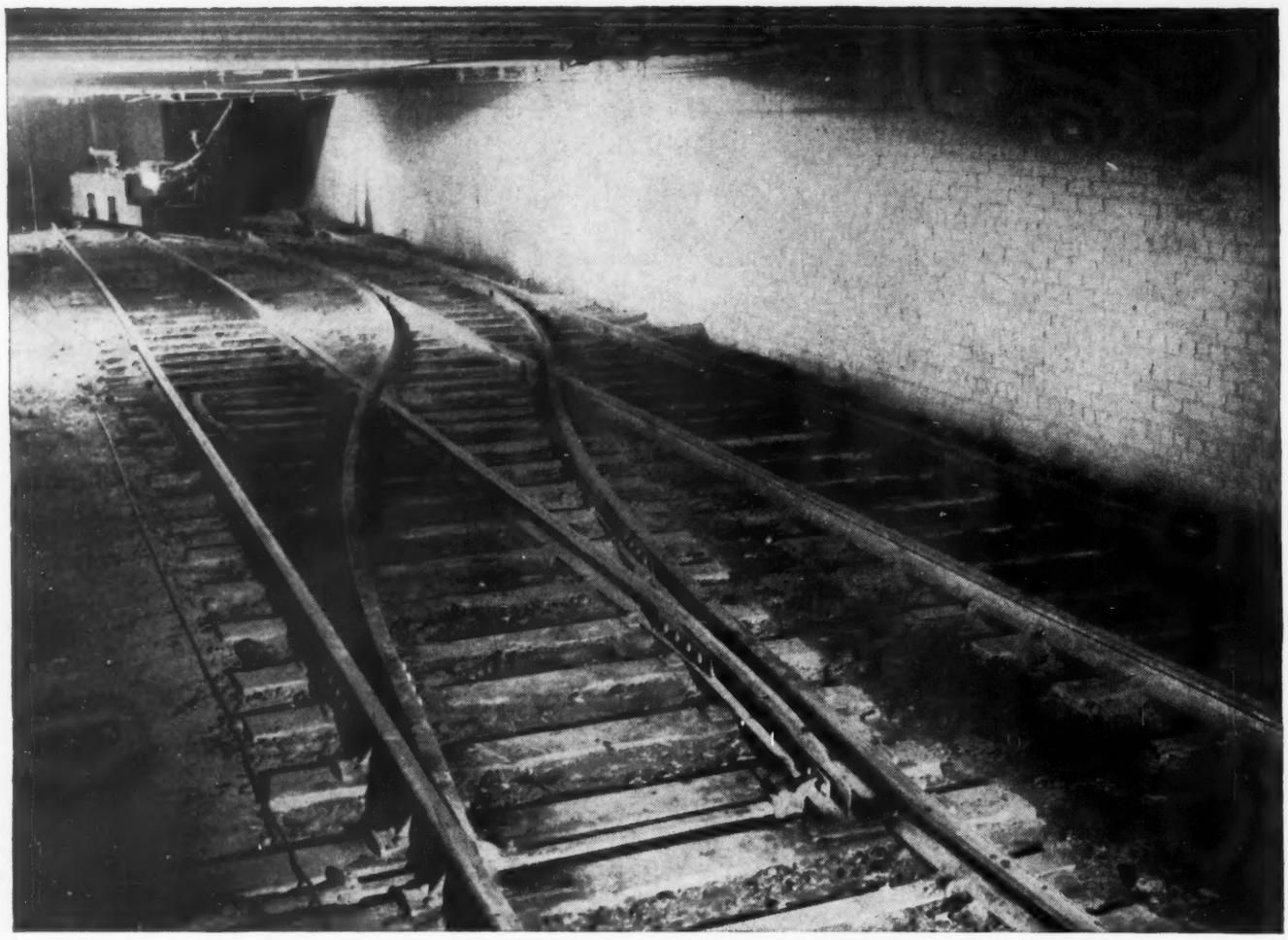
Soil Stabilizers
Stave Mills
Tractors
Trucks
Wellpoint Pumps

IT'S WISE FOR YOU TO SPECIFY GM DIESEL



Easy as Falling Off a Log

Ever watch a boy — and his dad — put together the track for a toy train?

Simple, wasn't it? They didn't have to cut rails, figure the curves, calculate the turnouts. It had all been done in advance by the manufacturer.

Bethlehem has gone that idea one better. For Bethlehem prefabricated track is first planned, then built, to meet the needs of your individual mine. Before a single rail is cut or curved, a Bethlehem engineer spends many hours in your mine, studying its details. Or going over drawings of future development work. After he is thoroughly familiar with your system, he starts planning track.

When you yourself have approved the plan, Bethlehem cuts the rails to proper length; does the necessary curving to correct radii; accurately prefabricates the turnouts. The entire system is designed for great flexibility, yet employs only a small number of basic rail lengths and curves. Installation is easy as falling off a log.

Bethlehem prefabricated track costs very little more than the material cost alone of conventional track. And this minor difference is offset many times over by the savings in track crews and by the greatly increased efficiency of your haulage system.

★ BETHLEHEM STEEL ★

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

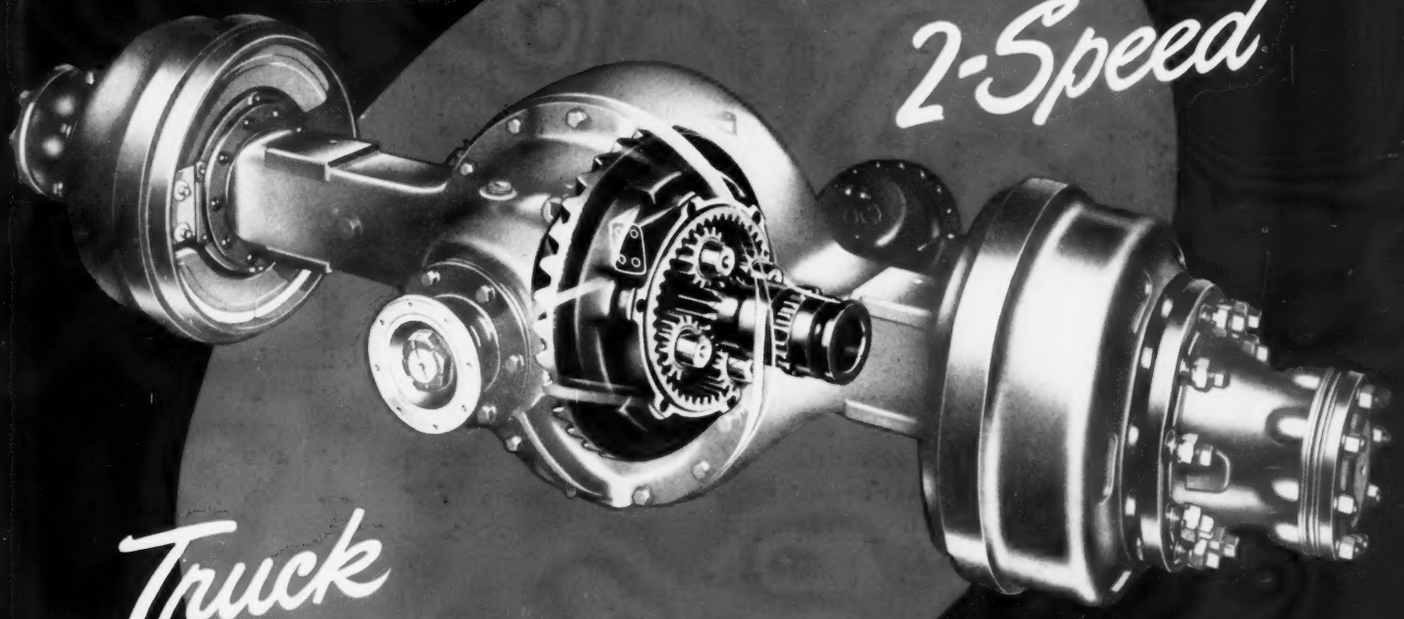
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM PREFABRICATED TRACK

Planetary Construction Gives

EATON

2-Speed



Truck

AXLES

Longer Life

The planetary construction in Eaton 2-Speed Truck Axles provides a number of basic advantages which contribute to efficient, trouble-free operation and long life for axle and vehicle. In the low-speed power range tooth-loads are distributed over *four* "planet" gears; stress and wear on the teeth are held to a minimum. Slow gear movement makes for easy shifting and silent operation. Outstanding performance records are proof of Eaton quality and design. See your truck dealer for complete information about Eaton 2-Speed Truck Axles.

MORE THAN ¾ OF A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

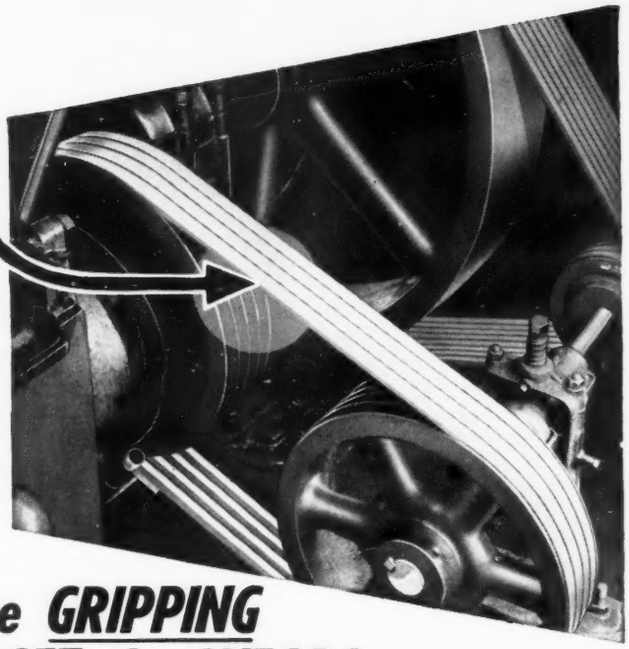
Axle Division

CLEVELAND, OHIO

THE SIDES of a V-BELT

Diagram of V-Belt in Sheave-Groove

Are ALL that TOUCH the Pulley



The SIDES Do ALL the GRIPPING Naturally — They GET the WEAR!

The moment you look at a V-Belt in its sheave, you see that the *sides* are the only part that ever *touch* the pulley. The *sides* do all the *gripping*—they get *all the wear* against the sheave groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides alone—take hold of the driven pulley and deliver the power to it.

That is why you have always noticed that the sidewall of the *ordinary* V-belt is the part that *wears out first.*

That's Why the CONCAVE SIDE
A GATES PATENT

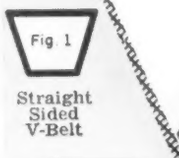


Fig. 1

Straight Sided V-Belt

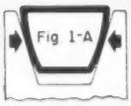
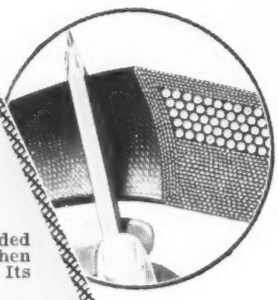


Fig 1-A

How Straight Sided V-Belt Bulges When Bending Around Its Pulley



You can actually feel the bulging of a Straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Fig. 2

Gates V-Belt with Patented Concave Sidewall

Fig. 2-A

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt is Bending Over Pulley.

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall — and that means much longer life for the belt!

Is IMPORTANT to You

Since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will naturally lengthen the life of the belt.

The simple diagrams on the left show exactly why the ordinary, straight-sided V-belt gets excessive wear along the *middle* of the sides. The diagrams show also why the Patented Concave Side greatly *lengthens the life* of the *sidewalls* of Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-belt can possibly give.

The Concave Side is Even MORE IMPORTANT Now that SUPER VULCO ROPES *Are Available!*

Now that Gates *SPECIALIZED* Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% higher horsepower ratings—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important now than ever before!

The Gates Rubber Company

"The World's Largest Makers of V-Belts"

DENVER, U. S. A.

483

Gates

THE MARK OF SPECIALIZED RESEARCH

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Looking for Motors? Maybe We Can Help You!

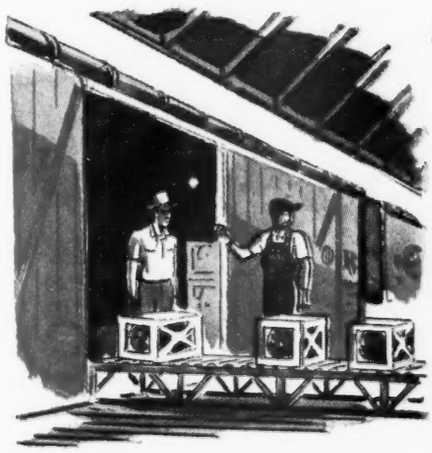
ALLIS-CHALMERS AUTHORIZED DEALER

ALLIS-CHALMERS REPRESENTATIVE

Do You Need General-Purpose, squirrel-cage motors from 1 to 200 hp? Get in touch with your nearby Allis-Chalmers *Authorized Dealer* or District Office. Either may be able to help you from stock right now!

But For Really Big Motors — 250 to 25,000 hp and over — call your Allis-Chalmers *field engineer*. He's an *expert* on motors—can help you solve difficult drive problems, involving large or small motors, in the most economical manner.

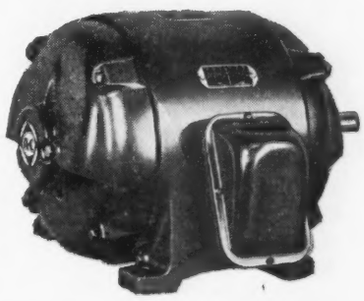
Want Reliable Information on motor delivery? Call *either* your Allis-Chalmers dealer or district office. They have *up-to-the-minute* delivery information available to them!



Motor "Headquarters"—½ to 25,000 hp and Up!

YOU SELECT from a *wide range* of motors when you call on Allis-Chalmers. And you can count on *expert* motor advice, too! The best possible motor selection is the result of careful appraisal of drive characteristics, the driven equipment, power source and surroundings. The best motor may not always be the first that meets the requirements.

Allis-Chalmers authorized motor dealers or factory representatives can help you choose wisely. They can save you time and money. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2401

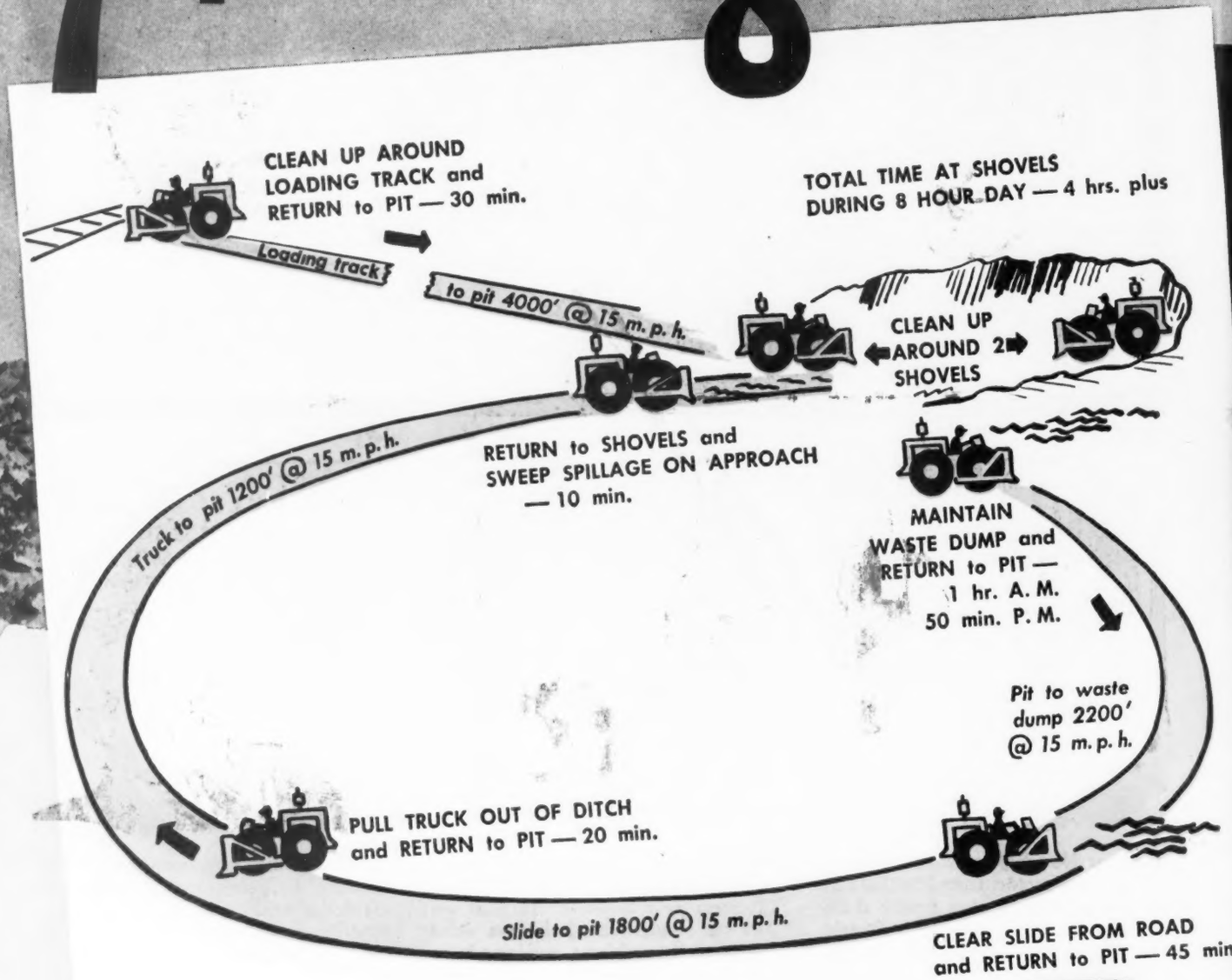


The Delivery Picture's getting brighter! Our motor-building capacity has been greatly increased. We've put new methods, new equipment to work to turn out *more* motors for industry, faster!

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

7 jobs in 8 hours


CLEAN UP AROUND LOADING TRACK and RETURN to PIT — 30 min.
Loading track
to pit 4000' @ 15 m. p. h.
TOTAL TIME AT SHOVELS DURING 8 HOUR DAY — 4 hrs. plus
CLEAN UP AROUND 2 SHOVELS
RETURN to SHOVELS and SWEEP SPILLAGE ON APPROACH — 10 min.
Truck to pit 1200' @ 15 m. p. h.
MAINTAIN WASTE DUMP and RETURN to PIT — 1 hr. A. M. 50 min. P. M.
Pit to waste dump 2200' @ 15 m. p. h.
PULL TRUCK OUT OF DITCH and RETURN to PIT — 20 min.
Slide to pit 1800' @ 15 m. p. h.
CLEAR SLIDE FROM ROAD and RETURN to PIT — 45 min.

A TYPICAL EXAMPLE

Find out what Tournadozer speed and mobility can do for You

LE TOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

with 1 TOURNADOZER

WHEN you see the new high-speed Tournadozer at work, be prepared for an entirely new conception of dozer service. It means new things for your pit — in more ways than one!

Travel speeds to 15 m.p.h.

Here is a dozer that can really ***"run"*** . . . 15 m.p.h. That's a mile in 4 minutes . . . twice as fast as slow-moving crawlers!

This means any job on your location is only a few minutes away for your Tournadozer. One unit can easily clean up for two or more shovels . . . level your dump . . . clean up around loading track . . . open drainage ditch . . . clear up blasted or washed-in material on your pit floor. And in most pits . . . do ***all*** of these jobs ***in a single day.***

30% faster working speeds

Tournadozer not only gets places faster . . . it's also up to 30% faster with a load than ordinary tractor-dozers. 180 h.p., with 4-wheel drive on giant low-pressure tires, put plenty of power and traction behind that big blade. Constant mesh transmission gives instantaneous speed selection ***without stopping to shift gears.***

15 m.p.h. REVERSE!

Same four speeds in reverse as in forward drive, means your Tournadozer can back up for each pass at speeds up to 15 m.p.h. On ordinary dozing cycles this means cutting the return half of your digging cycle by ***about two-thirds.***

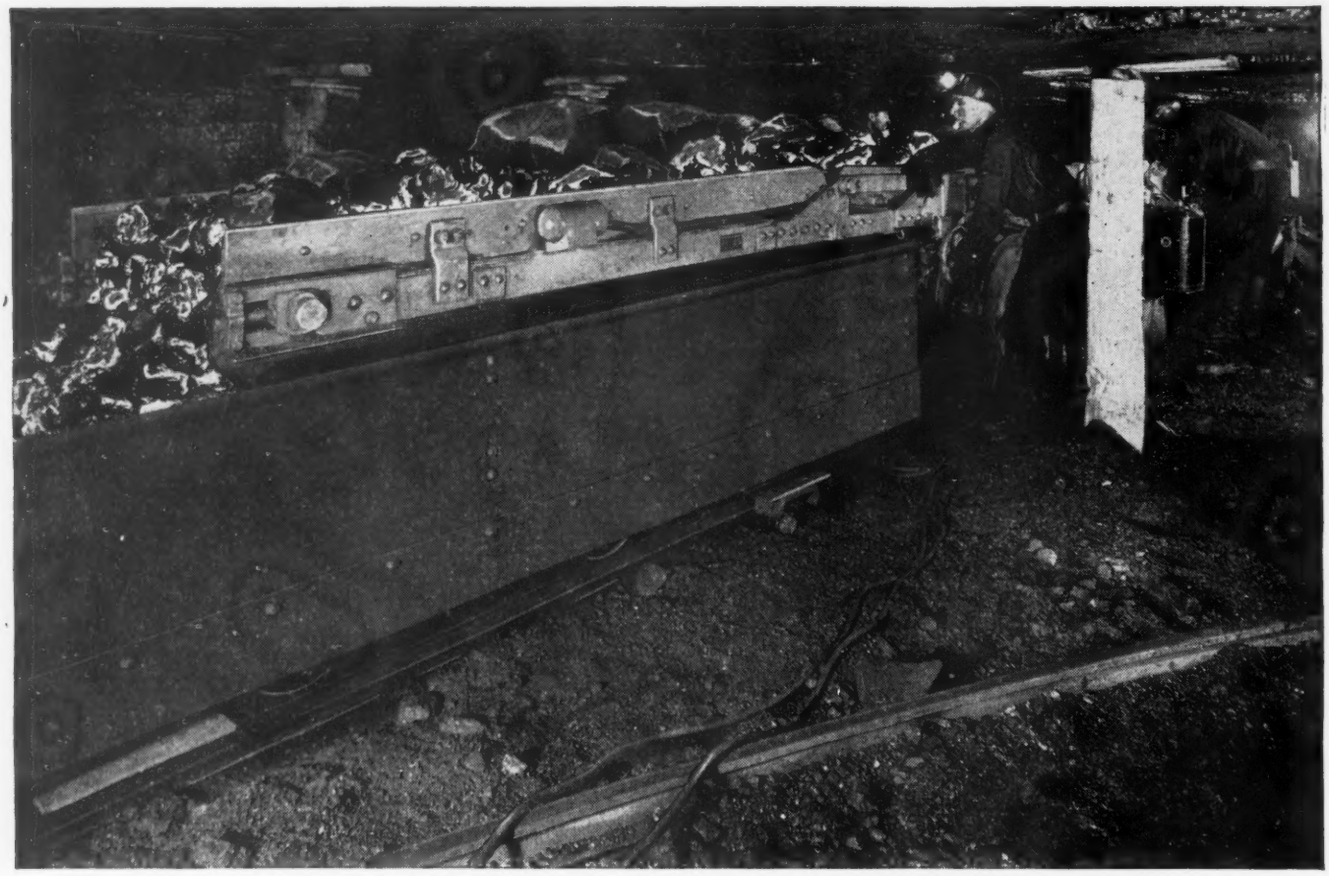
You need at least one of these fast rubber-tired Tournadozers for all-around utility work ***right now.*** Call your LeTourneau Distributor today for the information you need.

Tournadozer — Trademark

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

TOURNADOZERS



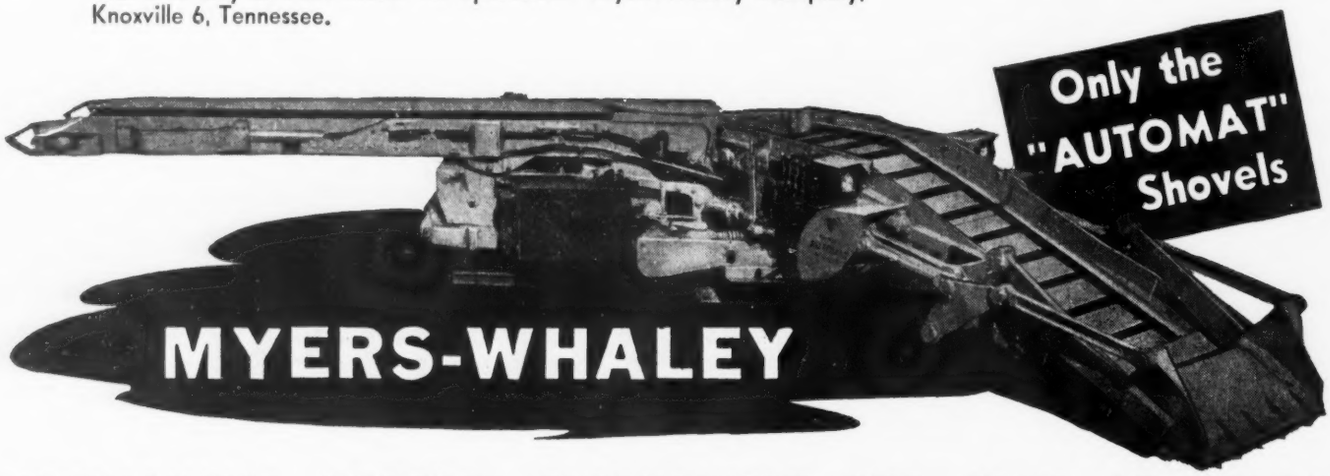
HERE'S HOW THE "AUTOMAT" LOADS HIGH CARS . . . AND LOADS THEM TO CAPACITY IN LIMITED HEAD ROOM

Looking at the picture above, it's easy to identify the loader as a Whaley "Automat". This is because the "Automat" is the only loader with a rear conveyor that at any height is always parallel to the top of the car. This means that rapid vertical adjustment of rear conveyor gives material loaded a minimum distance to fall. Result—less degradation of material, less wear on cars.

In limited headroom, as shown above, the "Automat" with its parallel lift rear conveyor loads cars to maximum capacity without crushing material, the heavier loaded cars making for faster shifting per ton and reduced haulage costs.

Check the above, and for safe loading . . . for dependable, efficient loader service, choose the natural shovel action "Automat". The loader that uses only 25 H.P. Motor for operation. Myers-Whaley Company, Knoxville 6, Tennessee.

"The 'Automat' will load, in its stride, any lump of coal that will pass through your tipple or any lump of rock your cars, aerial tram or larries can take."

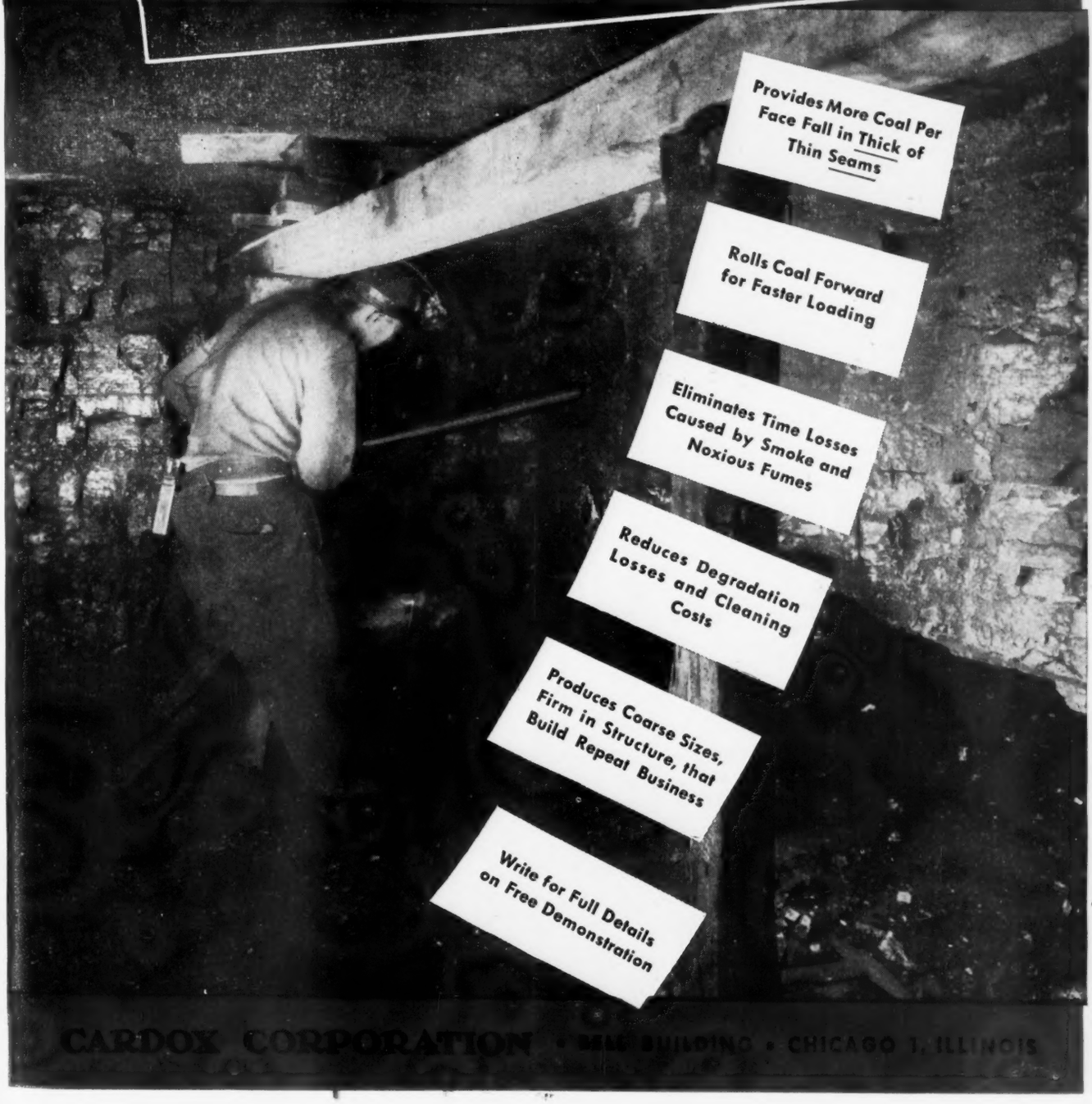


MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS

CARDOX

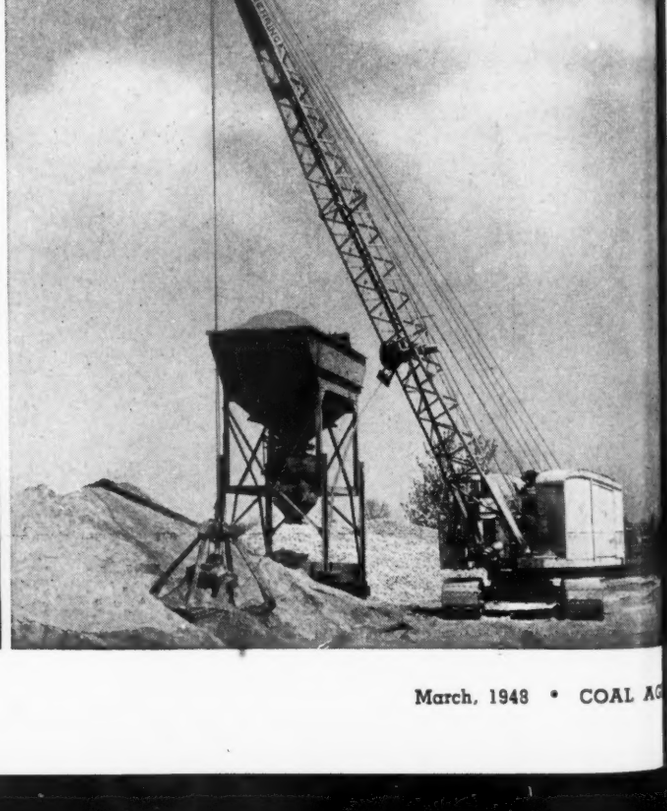
THE NON-EXPLOSIVE MINING METHOD

CARDOX HARDSOCG and Drilling Equipment


Provides More Coal Per Face Fall in Thick of Thin Seams
Rolls Coal Forward for Faster Loading
Eliminates Time Losses Caused by Smoke and Noxious Fumes
Reduces Degradation Losses and Cleaning Costs
Produces Coarse Sizes, Firm in Structure, that Build Repeat Business
Write for Full Details on Free Demonstration

CARDOX CORPORATION • [illegible] BUILDING • CHICAGO 1, ILLINOIS

MORE HOURS per shift with KOEHRING



MORE PROFITS per year
HEAVY-DUTY excavators

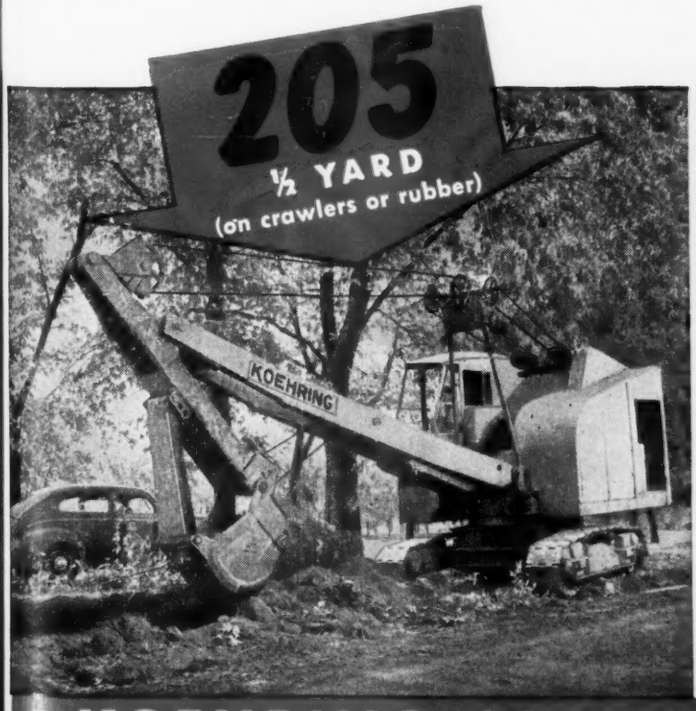
YOU get steady performance, cut maintenance delays and expense, save plant schedule readjustments, insure customer satisfaction, by using Koehring HEAVY-DUTY excavators. They are tough, long lived, built simple and handy to encourage good operator care and preventative maintenance. See your Koehring Distributor before you buy.

The Koehring 605, 1½ yard as shovel, is big and strong, ideal for rock excavation, with its heavy-duty shock absorber mounted shovel-boom. Mounted on Koehring self-cleaning crawlers, available in various sizes. Koehring 605 Cranes are equipped with a high A-frame which can be lowered or raised by power. The 605 is easily converted from shovel to crane, or dragline.

The Koehring 304, ¾ yard as shovel, with high operating speed and Koehring construction, gives you durability and increased production. You can get the Koehring 304 either crawler-mounted, or rubber-mounted as Cruiser Crane or truck crane for greater mobility. Front ends on crawler and truck models can be quickly and easily changed for shovel, pull shovel, dragline, or crane operations.

The Koehring 205, ½ yard as a shovel, features independent traction for greater speed and mobility and a 2 in 1 shovel boom for both shovel and pull shovel work. Heavy-duty construction, ease of operation, speed and maneuverability of the 205 gives you a money-making excavator. The 205 is available mounted on rubber or crawlers and is easily converted to shovel, pull-shovel, crane or dragline.

Write for FREE catalog



KOEHRING COMPANY Milwaukee 10, Wisconsin

Subsidiaries JOHNSON • KWIK-MIX • PARSONS

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...with

CORRECT LUBRICATION

A vital factor in keeping equipment available for continuous service is correct lubrication of every part of the vehicle. Failure of the smallest part—due to deficient lubrication—may put the entire machine in the shop . . . and shop time is non-revenue time.

Sinclair All-Point lubrication can be your guard against equipment lay-off. Sinclair lubricants are made for specific service at every individual point . . . to help keep machines moving.

Try . . . Opaline TBT, or Tenol in Diesels for sure, safe engine lubrication . . . non-foaming Opaline Gear Lubricant with extreme pressure properties to prevent galling and scuffing . . . Shamrock Lubricant for stay-put chassis lubrication in all weather . . . Sincolube for assured, enduring wheel bearing lubrication.

Let these tested lubricants help keep your equipment available . . . regularly and economically . . . always.

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AUTOMOTIVE LUBRICANTS

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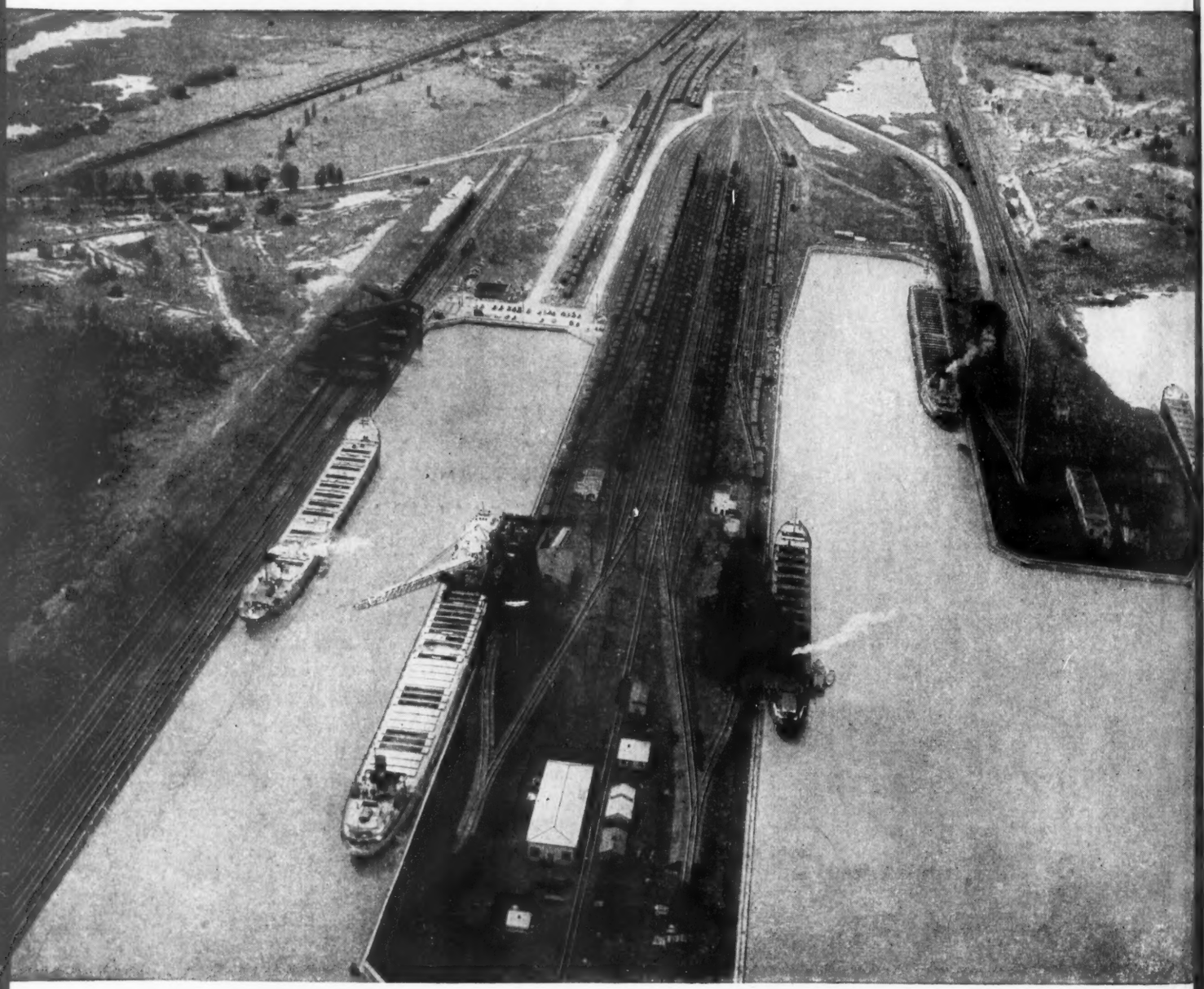
SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N. Y.

✓ 3½ MILLION DOLLAR

at Chesapeake and



16,978,000 TONS OF COAL IN 1947!

Chesapeake and Ohio's Presque Isle Dock Established The All-Time Record for Any Dock on the Great Lakes.

The dumping of almost *seventeen million tons of coal* from railroad car to ship's hold in 1947 represents an outstanding achievement. The coal industry and the Great Lakes shipping industry can rightfully share Chesapeake and Ohio's pride in this all-time record.

IMPROVEMENT PROGRAM

Ohio's Toledo Docks

Here is a fact of
TREMENDOUS IMPORTANCE TO THE ENTIRE COAL INDUSTRY

At its Presque Isle coal docks, which broke all records in 1947, Chesapeake and Ohio is investing three and one-half million dollars to make these coal handling facilities even more efficient for 1948 and the future.

These improvements, commenced last fall and near completion, include not only the Presque Isle docks and assembly yard, but extend to Chesapeake and Ohio's Walbridge yard, which serves the dock facilities.

Some of the principal items of this mammoth improvement program are additional tracks, a new "hump," the installation of mechanical car retarders, a pneumatic tube system, new buildings, and extensive engine house improvements.

The combined capacity of Presque Isle and Walbridge yards is over 15,000 cars. Almost 200 miles of track handle record volume of Lake Coal.

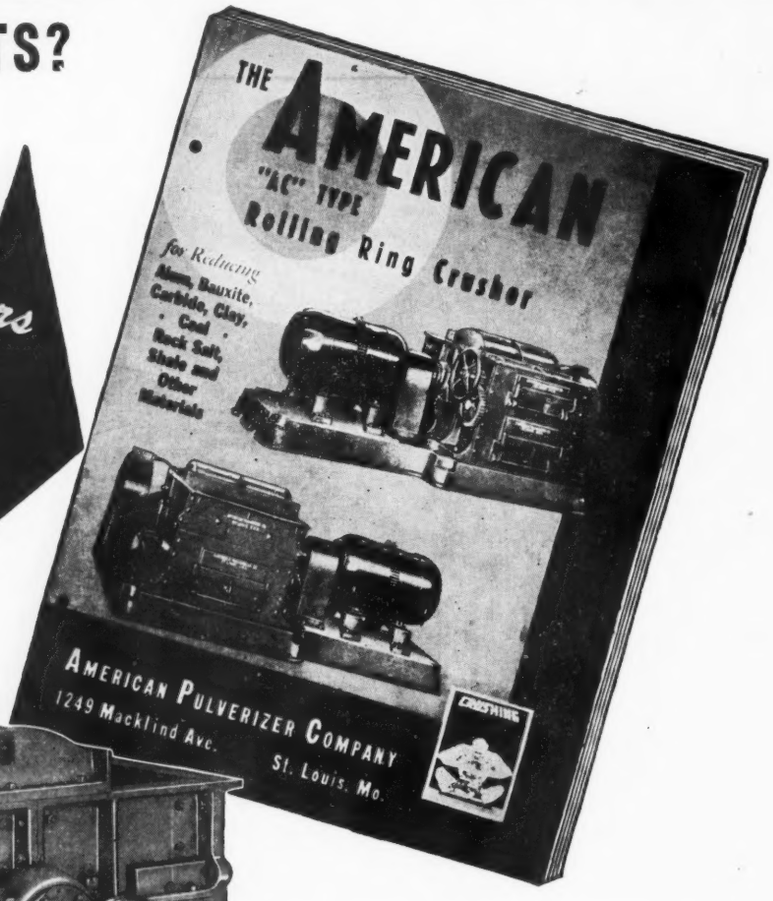
In addition to three low-levels piers, with handling capacity of 8,000 tons of coal per hour, Presque Isle provides three 17-ton Hulett ore unloaders.

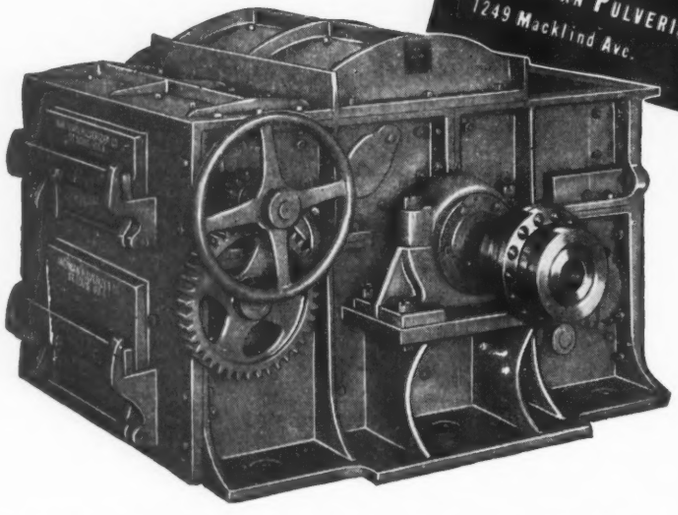
CHESAPEAKE AND OHIO

Largest Originating Carrier of Bituminous Coal in the World

HOW TO GET MORE EFFICIENCY for REDUCING INCREASED COSTS?

Many operators have found the answer in here....





The efficient performance of American Crushers is based upon the shredder ring action that splits by rapid impact rather than crushes for uniform sizing and high rate of reduction. Capacities up to 500 TPH.

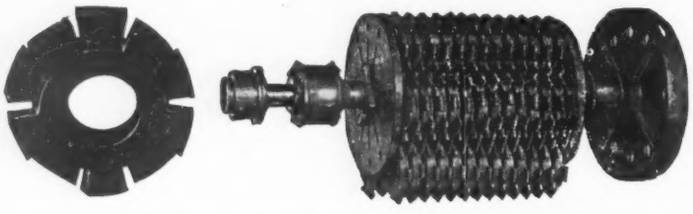


Illustration shows single shredder ring with its 20 cutting edges and heavy-duty rotor equipped with multiples of shredder rings.

The new "AC" bulletin is packed with facts, data and specifications on the American "AC" Crusher and it gives specific reasons and examples why the "AC" Crusher has proven so highly efficient and dependable in many mines throughout the country. Thoroughly illustrated, it shows the compact, sectional construction and the rugged design of these crushers as well as actual plant installations. If you are looking for a more efficient method of coal reduction send for the "AC" bulletin now!

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE.
ST. LOUIS 10, MO.

...by men who know costs

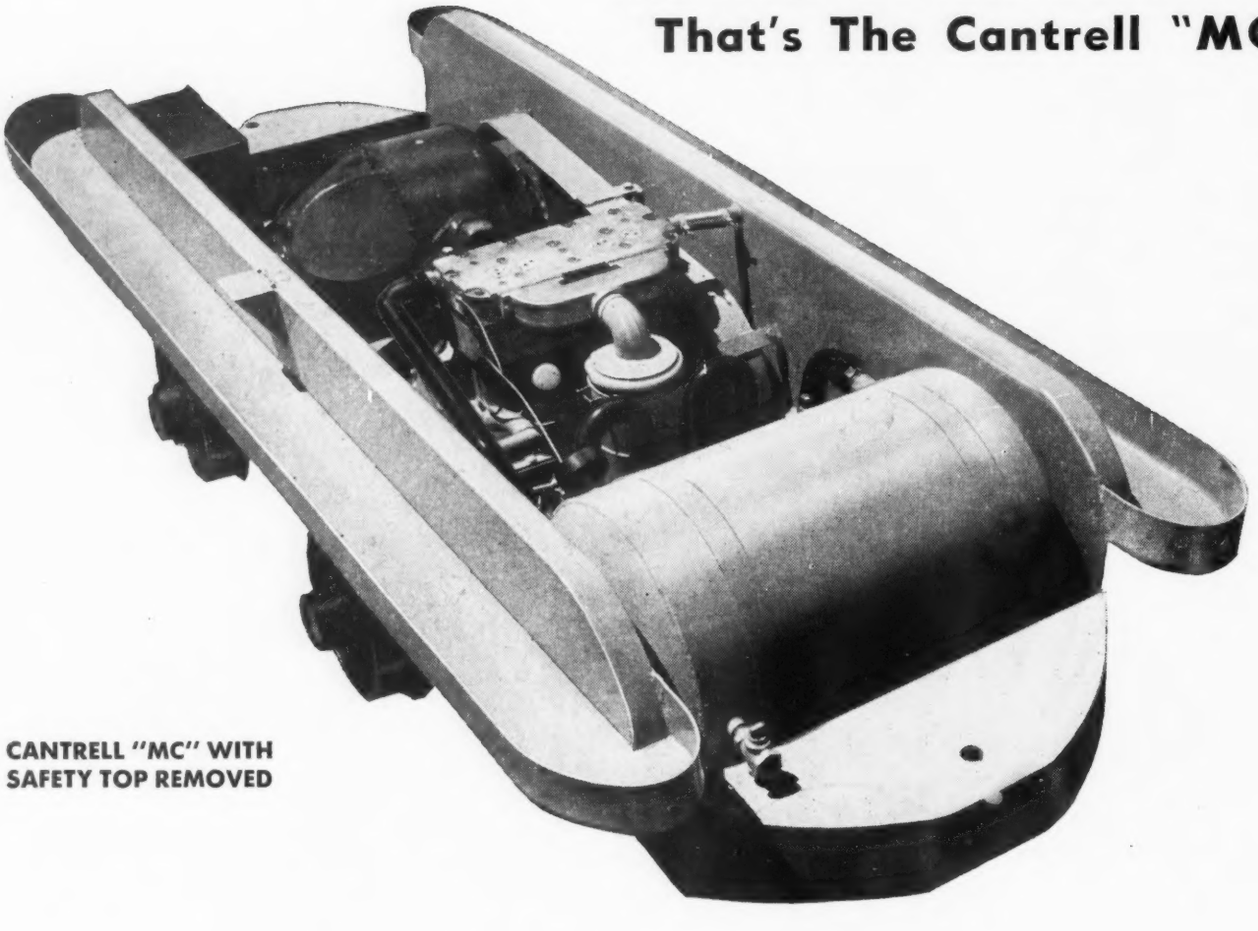
Predominance of Cummins Diesel Engines in the diesel-powered equipment of the country's leading mine operators is another strong endorsement of the performance of Cummins Diesels.

Such cost-conscious operators estimate the worth of an engine by its ability to stand up under the demands of the most rugged jobs . . . to operate with minimum downtime and maximum wear-life. They demand a diesel engine built to the highest manufacturing standards . . . a premium engine for premium jobs.

Ask your Cummins dealer for on-the-job evidence of the dependable, economical performance of Cummins Diesels in the equipment of leading mine operators in your vicinity.

CUMMINS ENGINE COMPANY, INC. · COLUMBUS, INDIANA

Complete Satisfaction In Hundreds Of Installations . . . That's The Cantrell "MC"

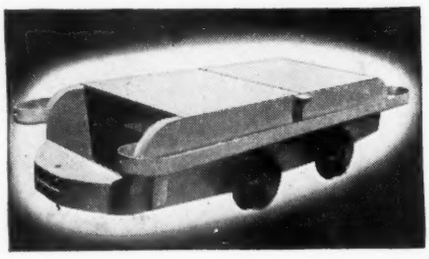


CANTRELL "MC" WITH SAFETY TOP REMOVED

Yes, the Cantrell "MC", Mine Car Compressor has the enviable record of giving unquestioned satisfaction in hundreds of installations, many of them under the most adverse mining conditions. It is efficient in the mines because it is built for mining by men who really know coal mining and what it takes in a compressor to do the job. The "MC" is a complete compressor outfit, ready for service, and is transported either in a train of cars or by locomotive. It is always ready to deliver the same dependable service that has made the name Cantrell famous in the coal mining industry. The "MC" is an exceptionally compact and simple design, featuring free axle mounting and ample trays for tools, repairs and hose.

Imperial-Cantrell builds a compressor for every requirement of track, trackless or stationary use. Write today for information on the complete line of Cantrell Compressors.

The "MC" with Safety Top in Place

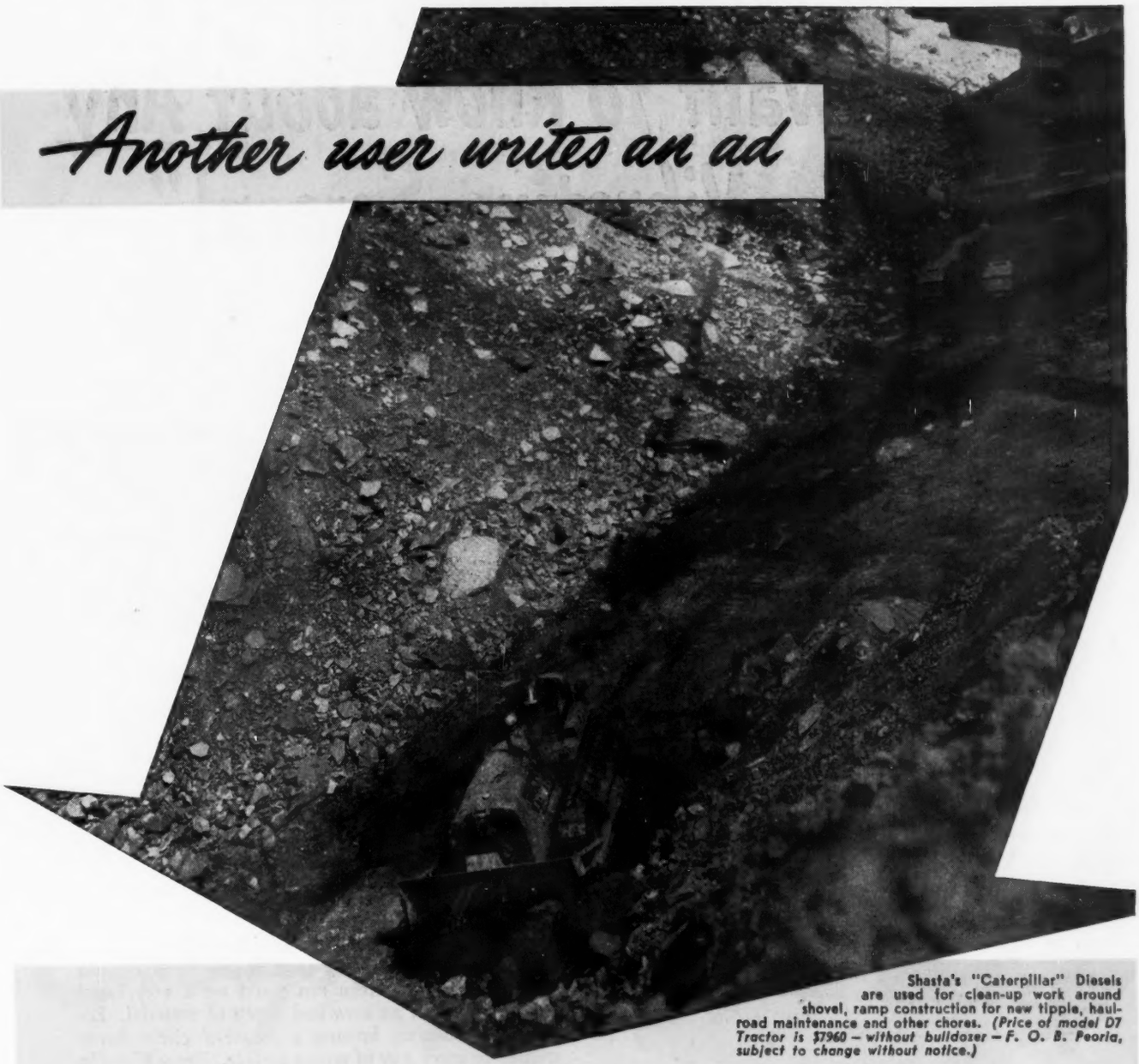


Cantrell COMPRESSORS

IMPERIAL-CANTRELL Mfg. Co.

JELLICO TENNESSEE

Another user writes an ad



Shasta's "Caterpillar" Diesels are used for clean-up work around shovel, ramp construction for new tipple, haul-road maintenance and other chores. *(Price of model D7 Tractor is $7960 – without bulldozer – F. O. B. Peoria, subject to change without notice.)*

SATISFIED USERS write the best ads—as hundreds of letters and statements on file at "Caterpillar" prove.

"I like the 'Caterpillar' D7 better than any tractor I ever used. We have three of them and they are standard equipment with us. Simplifies repairs, parts replacements, etc."

ROY AULT, *Superintendent*
Shasta Coal Corp., Bicknell, Ind.

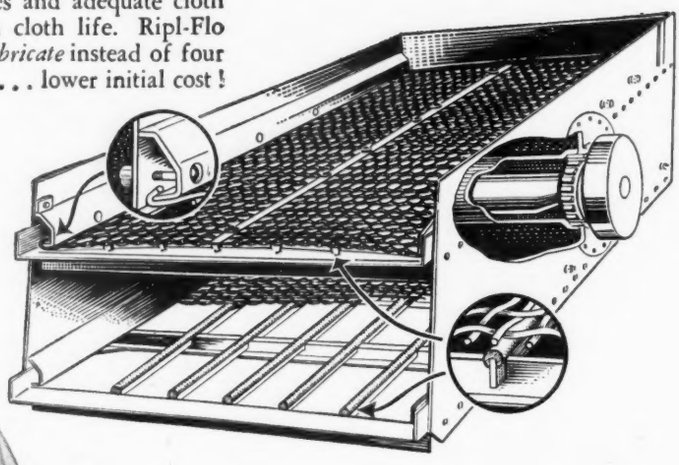
CATERPILLAR
REG. U. S. PAT. OFF.

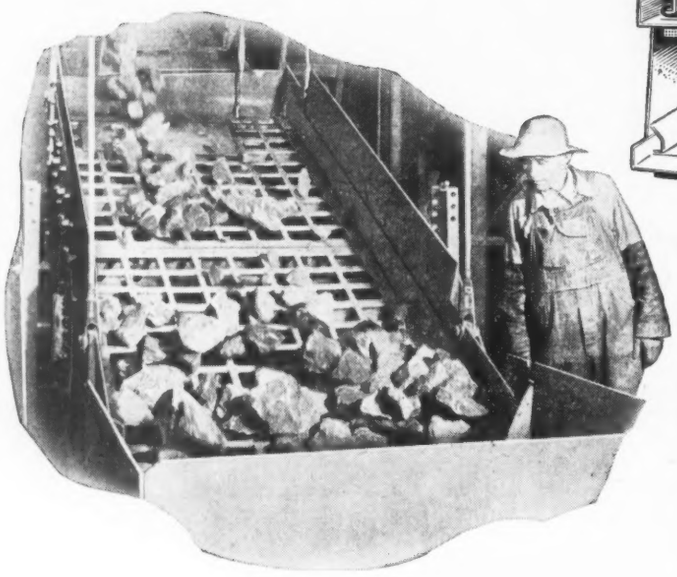
DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

"Two Main Things I want to know about Any Vibrating Screen!"

1. HOW IT'S BUILT: Take a close look at Ripl-Flo screen if you want to see long-life construction! Made of high strength alloy steel with all welded parts "stress-relieved" for durability. Accurately crowned support frames and adequate cloth supports greatly increase screen cloth life. Ripl-Flo screen has only *two bearings to lubricate* instead of four — less weight and maintenance . . . lower initial cost!





2. HOW IT WORKS: If you could watch a Ripl-Flo screen run you'd see a very rapid stratification and an *even* bed depth of material. Eccentric mechanism imparts a *balanced* circle throw motion to *every part* of screen surface. Every Ripl-Flo screen is tested before shipment for correct balance, throw, bearing temperature. You can change screen surfaces easily . . . because clamping plate adjustment is located *outside* of screen body!

• Ripl-Flo vibrating screens are built by Allis-Chalmers in 15 sizes from 3 x 6 to 6 x 16 ft, with one, two or three decks. Their use has resulted in *more profitable operations* in screening a wide range of materials. Send for Ripl-Flo Bulletin 07B6151B. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

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RIPL-FLO SCREENS

Combine Sound Engineering with Proven Performance!

Ripl-Flo is an Allis-Chalmers Trademark

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One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

Everybody likes to Dress Up

So? You didn't recognize your old friend? The new duds fooled you!

Yes, it's Bethlehem Wire Rope, the same reliable rope that's been serving you well for a good many years—but now it's all dressed up with a brand-new reel design.

Fine birds deserve fine feathers. If rope could talk, ours would be bragging about its new go-to-meeting clothes. But regardless of its togs, Bethlehem rope will still do the same down-to-earth job for you . . . handling your toughest loads dependably and economically. Ask for full details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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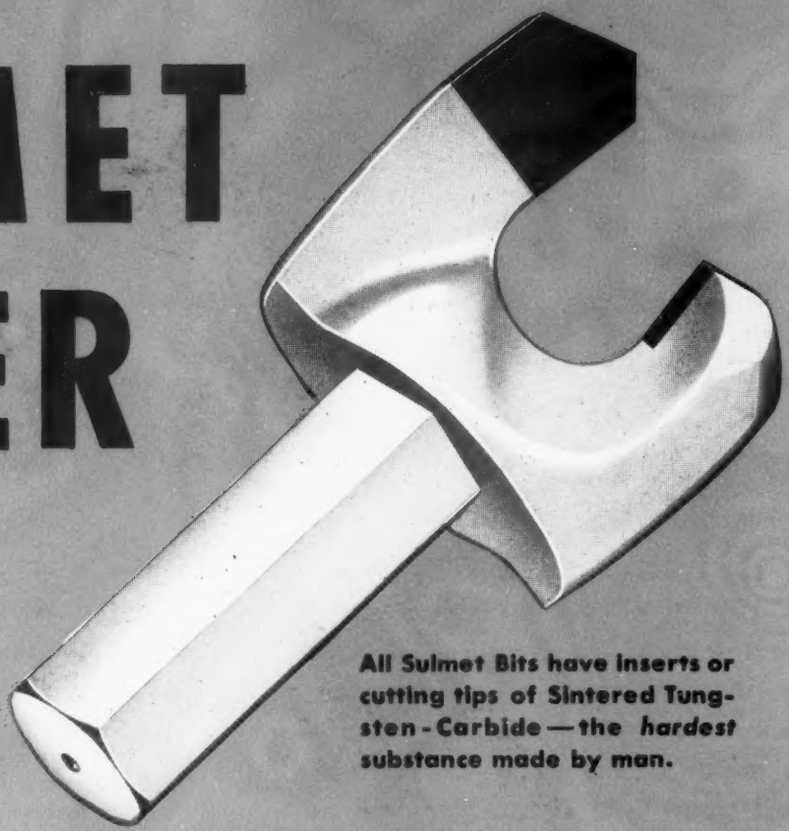
★ BETHLEHEM STEEL ★

When you think WIRE ROPE . . . think BETHLEHEM

Announcing

JOY

SULMET AUGER BITS



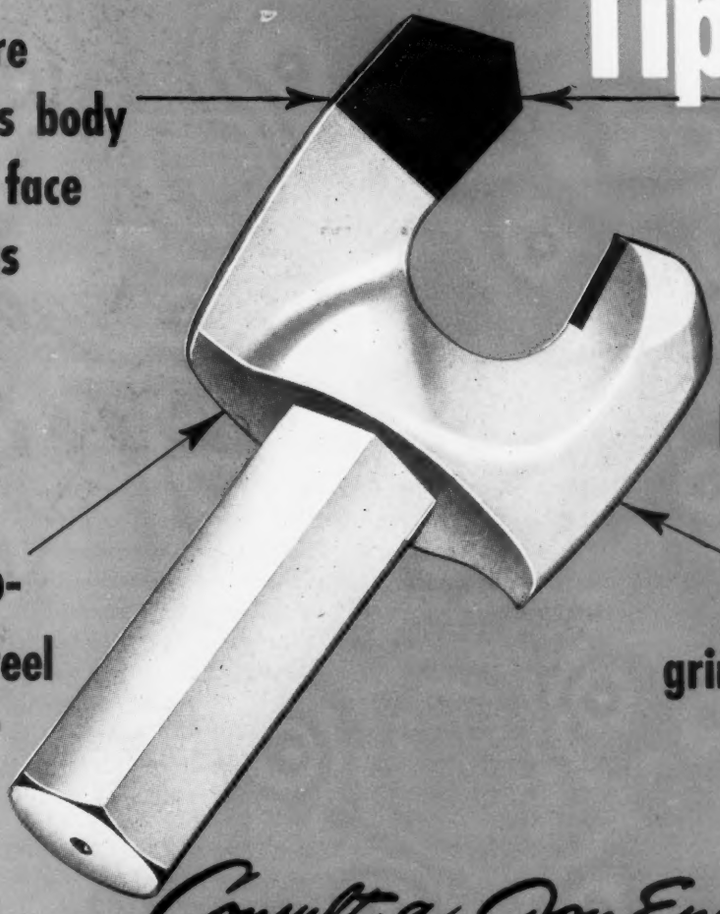
All Sulmet Bits have inserts or cutting tips of Sintered Tungsten-Carbide—the *hardest* substance made by man.

Drilling through coal, shale, slate, salt or potash is all the same to a Joy Sulmet Carbide-Tipped Auger Bit. It's designed for tough going—designed and built to stay sharp longer, drill farther and faster, and require less power than the best tool steel bit ever made.

The New
JOY AUGER BITS
Tungsten Carbide
Tips

No offset where Sulmet tip joins body of bit. Curved face permits cuttings to flow freely into flutes of auger steel.

One piece drop-forged alloy steel heat-treated body.



Tapered edge prevents hole drag. Allows regrinding of insert without grinding body of bit.

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

General Offices: Henry W. Oliver Bldg., Pittsburgh, Pa.

Photograph courtesy The Philadelphia and Reading Coal and Iron Company

Good digging requires good BLASTING

Even a giant bucket like this one won't fill up every time unless you have good fragmentation — the kind you get when you shoot with Primacord.

Primacord develops a hard-working combination of *full power* and *relief of burden* that results in this better fragmentation. *Full power* — because every charge is loaded in *direct contact* with Primacord . . . no matter how many holes you have, or how deep they go, *every* cartridge is detonated *at peak explosive power. Relief of burden* — because you can plan your shots so that front lines go a split-second before succeeding ones. Together, these two forces go all out to *boost* yardage and *reduce* costs.

Primacord has other advantages too. Packed on easy-to-handle spools, it's sure-fire in all kinds of weather. Hook-ups are made by simply tieing trunk and branch lines together with half hitches. Insensitive to stray currents, Primacord is the logical detonator to use near high voltage electrical equipment.

There's a grade of Primacord to meet every blasting condition. Ask your explosives supplier about it — or write us direct. P-3

THE ENSIGN-BICKFORD CO., SIMSBURY, CONN.

Also ENSIGN-BICKFORD Safety Fuse • Since 1836

PRIMACORD-BICKFORD Detonating Fuse

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MARCH, 1948

IVAN A. GIVEN, EDITOR

Fundamental Test

WHETHER other major industries can match coal's record of incidents in relations with union leaders is a question that might be argued at length. However, it is certain that coal has had its share and the end seemingly is not yet. Now, it is pensions. Soon, it probably will be demands for another wage increase and other concessions. Perhaps because the industry's key importance is becoming more appreciated and because it has attained a relative degree of prosperity, the idea seems to be that it and its customers can stand up under not only the demands of union leadership but also under such other burdens as restrictive strip-mining legislation and a spreading rash of tonnage taxes.

In agreeing to the establishment of health and welfare funds in the last contracts, both anthracite and bituminous operators agreed to pensions. No standards for pension payments were set, the matter being left to the trustees, subject, in the bituminous contract, to the provision that payments into the special pension fund shall be "based upon proper actuarial computations." In contrast, bituminous operators are faced with a demand for $100 a month for men reaching 60 with 20 years of service, coupled with a threat of unilateral union action if the demand is not granted.

Once more, therefore, the industry is faced with the question of whether to yield and pass the cost on to the consumer or try to maintain its position that a settlement be worked out on the merits of the case. Adherence to the latter course brings with it the threat that operators will be opposed not only by union leadership but by the present New Deal administration. Since coal has lost most of its battles with the government-union leadership coalition and in the past has had its consumer and public relations complicated in the process, it might be argued that the industry should give in and avoid a conflict, especially since it is in better position to pass the cost on. That, however, would open the door to a frankly monopolistic outlook. In addition, there are other considerations. For example, since conditions conceivably could change, complete surrender now might mean sacrificing indefinitely any opportunity for rectifying inequities in relations. Above all, however, regard for public and industry welfare is the best reason why coal should continue its efforts to achieve proper consideration of its suggestions for fair and just settlement of issues—whether pension or otherwise.

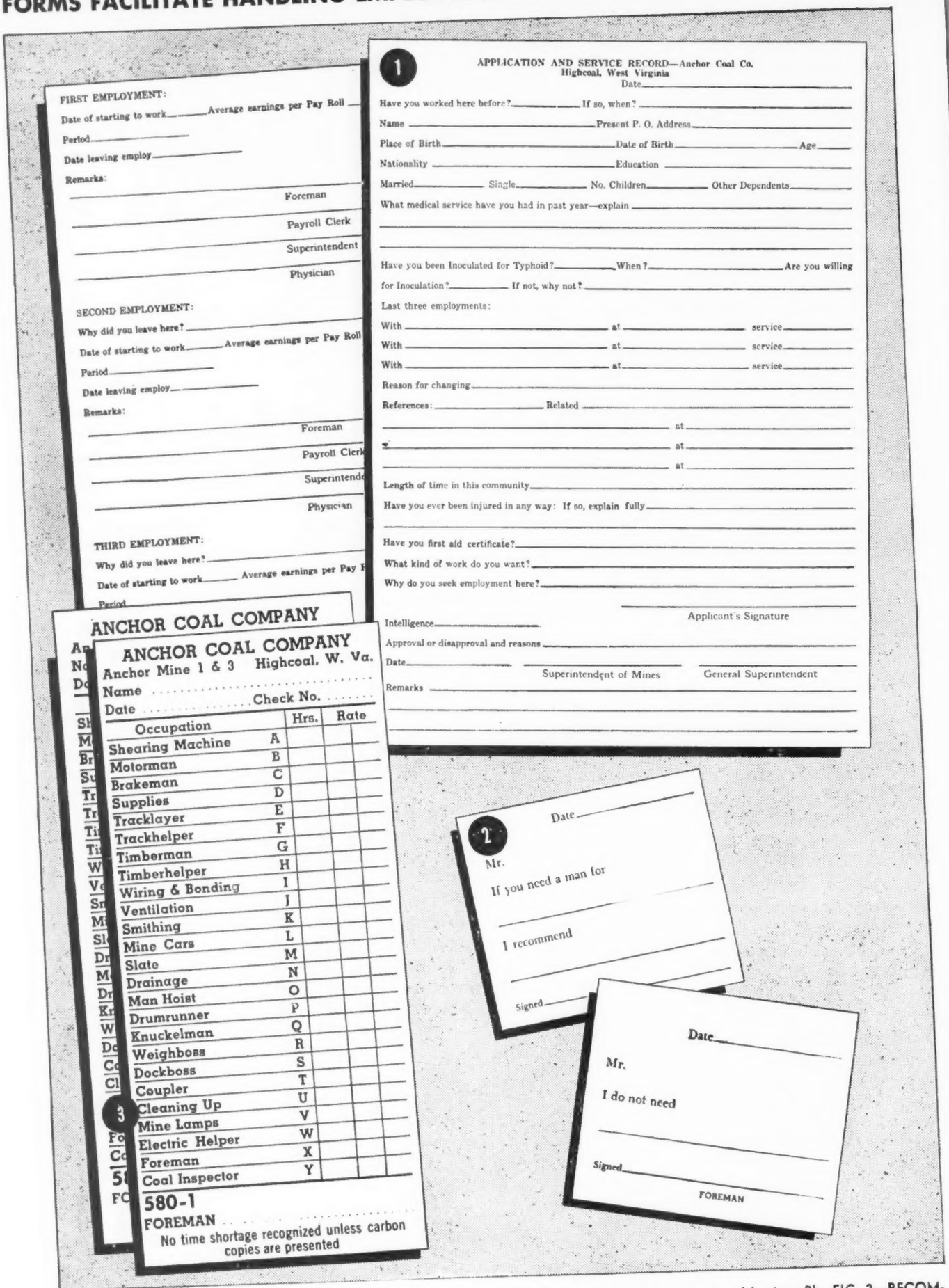
Sprag in the Wheel

CONFIRMATION of Dr. James Boyd as Director of the U. S. Bureau of Mines still is bogged down in the Senate Public Lands Committee. Meantime, the uncertainty of the situation hinders long-term policy-making and slows down the Bureau's day-to-day work, while Dr. Boyd serves without pay—a status few can sustain long.

The sprag in the wheel is Mr. Lewis' quest for power, seconded by servility in some senatorial quarters and reflecting a personal feud with Secretary Krug and opposition to an appointee who will not jump at his beck and call. Cloaking his real motive, Mr. Lewis alleges that Dr. Boyd, by his own admission not a coal man, therefore is not qualified.

The yardstick that really measures a director of the Bureau is mining know-how and administrative skill. Those are the real tests. The swift tide of international events, as well as our own domestic economy, leaves no room for running feuds and labor-leader appeasement in fixing our mineral policies, whether long-range or immediate. The coal industry should let Congress and any other interested parties know that it expects public officials, particularly those having to do directly with the industry, to be selected and confirmed on their merits.

FORMS FACILITATE HANDLING EMPLOYEE RELATIONS



FIRST EMPLOYMENT:
Date of starting to work_____Average earnings per Pay Roll
Period_____
Date leaving employ_____
Remarks:
Foreman
Payroll Clerk
Superintendent
Physician

SECOND EMPLOYMENT:
Why did you leave here?
Date of starting to work_____Average earnings per Pay Roll
Period_____
Date leaving employ_____
Remarks:
Foreman
Payroll Clerk
Superintende
Physician

THIRD EMPLOYMENT:
Why did you leave here?
Date of starting to work_____ Average earnings per Pay R
Period

1

APPLICATION AND SERVICE RECORD—Anchor Coal Co.
Highcoal, West Virginia
Date_____
Have you worked here before?_____ If so, when?
Name_____Present P. O. Address
Place of Birth_____Date of Birth_____Age_____
Nationality_____Education
Married_____ Single_____ No. Children_____ Other Dependents_____
What medical service have you had in past year—explain
Have you been Inoculated for Typhoid?_____When?_____Are you willing
for Inoculation?_____ If not, why not?
Last three employments:
With_____at_____service_____
With_____at_____service_____
With_____at_____service_____
Reason for changing
References:_____Related
_____at_____
_____at_____
_____at_____
Length of time in this community
Have you ever been injured in any way: If so, explain fully
Have you first aid certificate?
What kind of work do you want?
Why do you seek employment here?
Applicant's Signature
Intelligence_____
Approval or disapproval and reasons
Date_____ Superintendent of Mines General Superintendent
Remarks

ANCHOR COAL COMPANY

ANCHOR COAL COMPANY
Anchor Mine 1 & 3 Highcoal, W. Va.
Name .....
Date ..... Check No. .....

Occupation		Hrs.	Rate		
Shearing Machine	A				
Motorman	B				
Brakeman	C				
Supplies	D				
Tracklayer	E				
Trackhelper	F				
Timberman	G				
Timberhelper	H				
Wiring & Bonding	I				
Ventilation	J				
Smithing	K				
Mine Cars	L				
Slate	M				
Drainage	N				
Man Hoist	O				
Drumrunner	P				
Knuckelman	Q				
Weighboss	R				
Dockboss	S				
Coupler	T				
Cleaning Up	U				
Mine Lamps	V				
Electric Helper	W				
Foreman	X				
Coal Inspector	Y				

580-1
FOREMAN .....
No time shortage recognized unless carbon copies are presented

2

Date_____
Mr.
If you need a man for
I recommend
Signed_____

Date_____
Mr.
I do not need
Signed_____
FOREMAN

FIG. 1—PRE-EMPLOYMENT and employment history are recorded on front and back sides of this sheet and kept on file. FIG. 2—RECOMMENDATIONS for hiring and firing are routed to one official. FIG. 3—DUPLICATE time slip enables worker to check his pay.

Handling Disputes at the Mine

How Disputes Arise—Careful Hiring and Prompt Action Head Off Most Complaints—Ways to Handle Discharges and Avoid Pay Disputes — Firmness a Good Policy — What to Do When Disputes Get Out of Hand

By VAN B. STITH
General Superintendent, Anchor Coal Co., Highcoal, W. Va.

THE BEST WAY to handle labor disputes and grievances is not to let them happen. But if they do happen, a pattern of action based on experience, understanding, foresight and firmness can minimize their effects and bring about a settlement with least injury to worker, management and production.

Misunderstandings and complaints, which may grow into grievances, are as varied as human nature. Every worker, because he is an individual, is the carrier of a potential labor dispute and each issue, when and if it develops, becomes colored by the personalities of the men handling the opposite ends of the argument. The result is sometimes a confusing and ever-changing flow of complaints, disputes and grievances that tax the human-relations skill of management.

However, in spite of their variety and number, labor relations issues fall pretty well into three broad classifications, as follows:

1. Differences between an employee and his foreman—protests against discipline; accusations of racial, political or religious discriminations; complaints against defective machinery, insufficient tools, production rates and quality standards; disagreements over safety rules and safety promotion.

2. Differences over the industry-wide contract and company rules, policies and attitudes—complaints about pay shortages and payroll deductions; dissatisfaction with maintenance and sanitation of company-owned living quarters; protests against company stores, welfare work, medical and hospital facilities, employment physical examinations and general working conditions; dissatisfaction with the personal attitudes of management and the general direction of the working force.

3. Off-the-job disputes — social cliques, jealousy and disrespect between persons charged with different degrees of responsibility and jealousy between workers in desirable and undesirable jobs.

Every Complaint Important

In most instances, use of the term "grievance" or "dispute" to describe these cases is a little harsh. Most of them grow from a very simple difference of opinion. But, no matter how insignificant it may appear, each dispute must be given importance and handled promptly. If not, an accumulation of disputes will shape up into major issues that may effect top management. It is a matter of record that in many instances simple disputes have progressed to major issues and have closed down properties completely —a big price indeed to pay for not heeding the small demands in the beginning.

The germ of discontent is like any other germ. It grows, reproduces and multiplies. There is no germ more adapted to rapid growth than that of a disregarded wrong, whether it is real or imaginary. Indifference on the part of management toward an employee who thinks he has been wronged causes irritation, and long irritation causes men to bide their time and seek revenge at the first opportunity. I am sure that we have all noted strikes where the grievance was so small that it seemed fantastic. The fact is that the strike was not caused by this last grievance—it was just the last straw. Investigation of a few of these work stoppages revealed the fact that many prior grievances had been shoved aside by management until later.

Any intimation on the part of an employee that he is dissatisfied with his conditions or treatment warrants investigation at once. A frequent adjustment of small things is much better than a grand adjustment of many complaints and, in any event, the grand adjustment most times comes too late.

Since the removal of the penalty clause in the nation-wide contract and the adoption of the "able and willing" clause, local and prompt settlement of grievances becomes more important than ever. The United Mine Workers officials, from the president of the district down through the field representatives, are keen thinking people, at least intelligent along labor-relations lines. These men know that we have a market that is demanding more coal than we can produce. They know that we have commitments with old-line customers which we are most desirous of filling. Therefore, if a grievance at the mine gets out of hand to the extent that there is a work stoppage, it usually will be found that the grievance machinery of the U. M. W. A. is very slow to function, especially if the employees are wrong. Union officials just stand by, knowing that very soon, in most cases, the operator will give up to get his property producing coal once more.

When to Stand Firm

Disputes of this kind should be avoided, and most of them are avoidable. However, once the property is idle because of an illegal strike, there should be no giving in on the part of the operator. Union tactics like these are most effective when top management is sales-minded. This sort of management can see but one thing: the property is idle while the best customers are suffering for coal. I appreciate this side of the picture, but getting a property back into production for such a reason is only temporary relief and will result in more strikes and more non-producing periods. Once forced into an issue like this, the operator should stand firm for what is right.

The coal operator is in business to make money. To make money, he must produce coal—not labor disputes. Each labor dispute cur-

Based on a paper read before a joint meeting of the West Virginia Coal Mining Institute and the Central Appalachian Section of A.I.M.E., Charleston, W. Va., Dec. 12-13, 1947.

tails production. The degree of curtailment is in direct proportion to the seriousness of the dispute. Therefore, it behooves management to handle labor differences and disputes promptly and properly as they arise. A management employing such a program and thoroughly schooled in the practice of avoiding unnecessary differences at their source will have smooth sailing.

To avoid disputes, I emphasize and recommend a rigid pre-employment program. The day is gone when the applicant asked the foreman for a job and was told, "Full up," or "Report for work tomorrow"—or at least it should be gone. I realize that some of us modified our employment standards during the recent war. We needed men and employed almost anyone seeking work. Consequently, we had many unnecessary headaches.

What to Ask Job-Seekers

An applicant for employment should answer a series of questions designed to get the information required. His answers should be recorded by the interviewer and filed. The form may vary, depending on what information is desired, but a combined application and service record like the one in Fig. 1 meets the need pretty well. The record of previous employment is important, also the applicant's family background, information about his dependents, the health of his family, the reason he has applied for work as well as the reason he left his former employer, the work he is best suited for, his education, and his behavior and ability while in your employment.

If an applicant has a friend employed at the mine, try to obtain a recommendation from the friend. Then, if the new man gives you trouble, call to account the friend that recommended him. Give the applicant a physical examination. An unhealthy person often is a contrary person. Give him a copy of your safety rules along with the state law.

This employment procedure may seem rigid but experience has shown that desirable applicants readily submit to the requirements. Even with an employment procedure as tough as this, a few bad ones will slip by. However, it will be found that the percentage of good men will be much above the average.

I recommend that one person be responsible for pre-employment procedure. If the superintendent or foreman knows a good man and really wants to employ him, let him use a small recommendation form like the top one shown in Fig. 2, which is printed on blue paper. With this form, an applicant can be rejected without embarrassment to the recommender.

Discharge cases cost time and money. When an employee first came to work, records had to be made, physical examinations were given, he had to be instructed in his job and in the peculiar working conditions in his mine and social security records had to be set up. All this added up to high employment costs. If the new man doesn't fit into the picture and has to be dismissed, all is lost.

A discharge case also means that somebody along the line has made a mistake—either the individual who did the hiring failed to find the new man's weak spots or the supervisory force failed to make the individual a member of the production team.

The best guard against discharge cases is a pre-employment procedure like the one outlined above. But if there is no alternative to discharging an employee, he should be dismissed as pleasantly as possible, without fanfare or hard feelings. One person should be vested with final authority to discharge. This official, well versed in contract procedure and highly interested in the welfare of the company and its employees, should be the last to talk with the departing employee. A system like this will avoid the petty jealousies, off-the-job differences and mistakes of judgment that cause so many discharges.

When it is necessary to dismiss a worker at our properties, the person recommending the discharge uses the lower form shown in Fig. 2. After this form reaches my desk, I investigate thoroughly and then proceed according to my findings.

In handling men, give all differences and disputes prompt and undivided attention. Do not be impulsive in making decisions. Snap judgment by an executive handling labor disputes has too often caused unending trouble and loss to the operator. Lend importance to the complaint by asking for time to study it. Since your association secretary is just as near as your telephone, seek his advice before making a final decision. If you cannot settle the issue locally, he will represent you later, so why not get his advice in the first place? Through my experience in representing the operators of the Kanawha district on the labor board, I know that cases handled properly at the mine reach a conclusion smoothly. On the other hand, I regret to point out that we have too many cases which, because of improper handling at the mines, render our task nearly impossible. If by chance your company is not a member of an operators' association, then seek advice from some person in whom you have the utmost confidence. Two heads are better than one.

Handling Complaints Promptly

Time is of the essence in settling all disputes and I repeat that although haste in judgment is undesirable, speed in the discussion of a complaint is most desirable. You may have many operating and other problems on your hands at the time the local committee asks for an appointment. Take my advice: set them aside and give the committee a big ear. Once the grievance is explained, it may seem small and insignificant and most of the time it really is, but treat it as important business.

Never condemn your foreman in the presence of the committee. If the foreman is wrong, talk to him privately. Instruct him in what to do and let him do it without your interference. If you cannot settle the case, take it under advisement. Consult your association secretary. Then if you continue to disagree, call all parties in and tell them about it. When you inform them that you cannot agree and that the case must go through proper channels, be sure you convince them that the disagreement does not carry anything personal and that there is no reason for ill feelings on the part of any persons involved. Tell them further that the case will be decided and that you will gladly abide by the final decision.

Wage rates should never be tampered with at the mine. Classification should be clearly stated on the time slip and the contract rate applied according to classification in the office where the payroll is maintained and computed. This procedure will eliminate mistakes in the interpretation of contract rates. The person designated to apply the rates must know the rates and the proper method of presenting them to the employee through the pay-period statement. After all, the supervisor on the job should be well occupied with production problems. Why clutter up his mind with unnecessary details of contract items?

Many methods are employed in

timekeeping. This item has increased in our business during the past few years with the trend away from piece work to hourly rates. Omitted time has caused a great deal of unnecessary confusion. If a man works eight hours and a few hours overtime, he should receive credit for that work on the day he performs the work. It is very embarrassing for a worker to calculate that he will receive a certain sum of money in his pay envelope and then discover that he has been shorted. A method should be used that will enable the workman to know each day that he has received full credit for his work for that day.

Miner Gets Own Time Slip

Likewise, a method should be used that will eliminate any doubt as to the honesty of the employee's claim of being short. This can be accomplished by several methods such as time clocks, duplicate work slips or posting time daily on the bulletin board. I use the duplicate time slip (Fig. 3)—one copy each day to the workman and one to the office. This form is patterned after the ordinary grocery-store charge slip, with carbon on the back of alternate slips. Each book of slips is numbered, as well as the individual slips. The foreman is charged with the book and must account for all 50 slips in the book. If an error is made, the workman can detect it at once and will have no trouble getting it corrected. If he is short when he receives his semi-monthly statement, he can present his time-slip copies in support of his claim. This eliminates the old argument between boss and employees as to whether the man did or did not work the time and leaves no room for doubt.

Local agreements have caused no end of headaches for those responsible for settling disputes that pass on to the district. Some management executives are pretty good salesmen and can persuade the president of the local union and the mine committee, and even a large segment of the employees to agree to some condition or idea not covered by the contract. This is all very well, but just what do you have? The value to be derived from these individual agreements is very questionable, inasmuch as they may work smoothly for a period of time until suddenly some employee finds fault with them, takes up his case and throws a multitude of back-pay cases at the operator, demanding quick settlement.

The district U.M.W.A. representatives will not support private agreements. My advice is that if a private agreement, not covered by the contract, is made, management get the approval of the operators' association and the U.M.W.A. district officials before placing the agreement in force. If this approval is not forthcoming, then forget the whole thing. No person or group of persons has the authority to enter into any agreement that is not covered by the contract.

In dealing with labor, first convince yourself that employees are human just like you, with much the same tastes, aspirations and aims. Most of them will go along just about as you would have them go if the course is pointed out to them in a fair and square manner. Where management fails to take labor into its confidence and explain its objectives and its problems, it cannot expect the employees to appreciate the company's side of the picture. The average mine employee of today has better than a common-school education. More than you would think have a high-school education and even college graduates can be found laboring in the mines. The average coal miner today owns an automobile, has a good radio, goes to the movies and lives on a much higher scale than miners of years gone by. He reads the same newspapers, the same magazines and the same books as his boss. He forms opinions, expresses them and influences or is influenced by those around him.

It is evident that some of us in the coal business are better equipped to handle labor disputes than others. However, all of us can do a fair job by just a little forethought and practice. Give your labor disputes as much thought as you give your preparation, mechanical loading, haulage, ventilation, safety, etc., and you will find yourself making progress.

There are several ways of achieving and maintaining cooperation. I warn you against giving labor everything it asks for. Workers will not respect a management that travels a one-way street. Many production officials think it most desirable to be hailed by the workmen as a good fellow and to get this reputation they give their men everything they want. It is desirable to be judged a good fellow by your men, but there is a better way to be a good fellow than giving in to everything—at least from a production standpoint. I believe that the term, good fellow, if it is to be lasting, protect the property and return a fair profit on the investment, can be attained by a reputation for truthfulness, fairness, ability and energy. This will protect the workman as well as the operator. It is a program that will continue to live over the years. The operator who elects to give his men everything they ask for will soon have a spoiled child on his hands—and it will not be the child's fault.

Stick to the contract whether it benefits you or not. Make no person a promise of any kind. If you are wrong, be prompt to say as much. Be sure you are right before making a decision. Once you make a decision, stick to it. Know your working contract. Work very closely with your association, as there are umpire decisions, of which the ordinary operator knows nothing, that all but set aside the contract. Deal with local disputes promptly. However, do not be impulsive in your decisions. If a labor dispute leaves the mines for adjustment, you have two strikes on you to begin with.

Basic Rules

This discussion could go on, for conditions between mine and mine are different and many disputes arise out of local conditions. But there are many general rules that can be used as a guide for dealing with labor. I will cite just a few, as follows:

1. Obtain a thorough knowledge of your working contract and then adhere to it.

2. Work closely with your operators' association.

3. In dealing with labor, be fair, truthful, honest and firm in your decisions.

4. Do not make promises. If you have something to pass out to an employee, wait until you are ready and then give it to him.

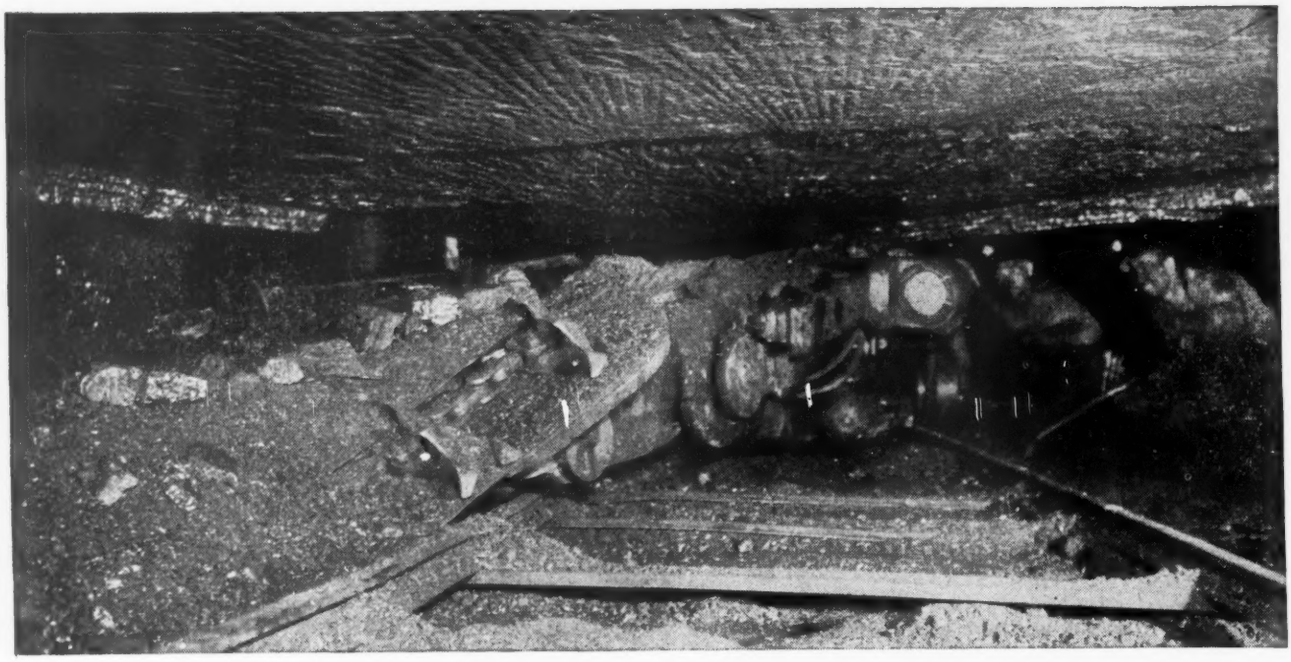
5. Handle disputes promptly.

6. Do not be impulsive in your decisions.

7. Devote much time to your employment and discharge systems.

8. Make every effort to settle all disputes at the mines and with the miners.

These basic suggestions will speed up the handling of disputes for both parties, operator and worker. Procedures of this kind must offer mutual benefit and protection if they are to receive whole-hearted support in their use.



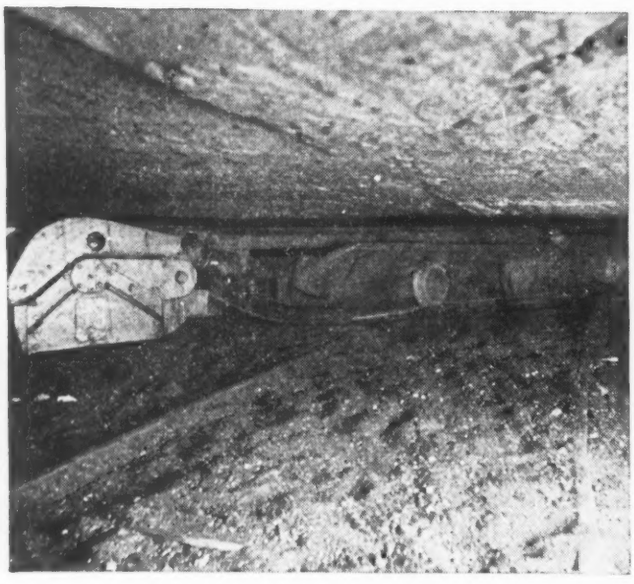
LOADER ON PREFABRICATED TRACK loading a cut in a 22-ft.-wide air course in 38-in.coal.

Low Loaders Serve New Mine

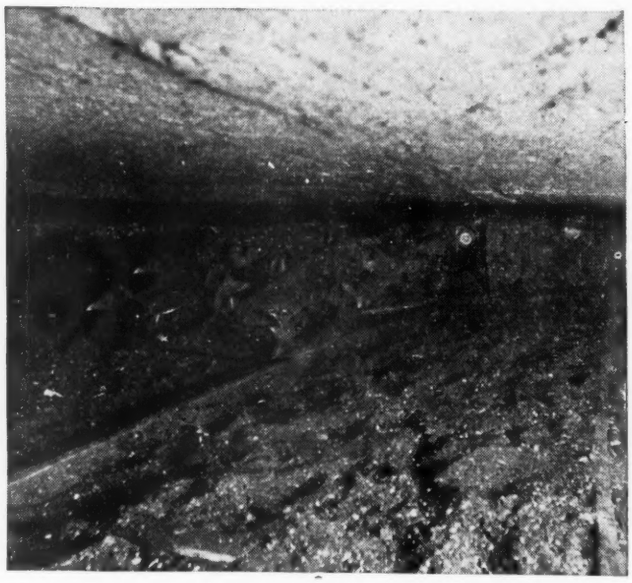
Prefabricated Track and Large Drop-Bottom Cars Enable Low-Type Loaders Handling Both Coal and Rock in Developing Springfield No. 4 Mine to Maintain 18-Tons-per-Man-Shift Average in the Sections

By J. H. EDWARDS
Associate Editor, Coal Age

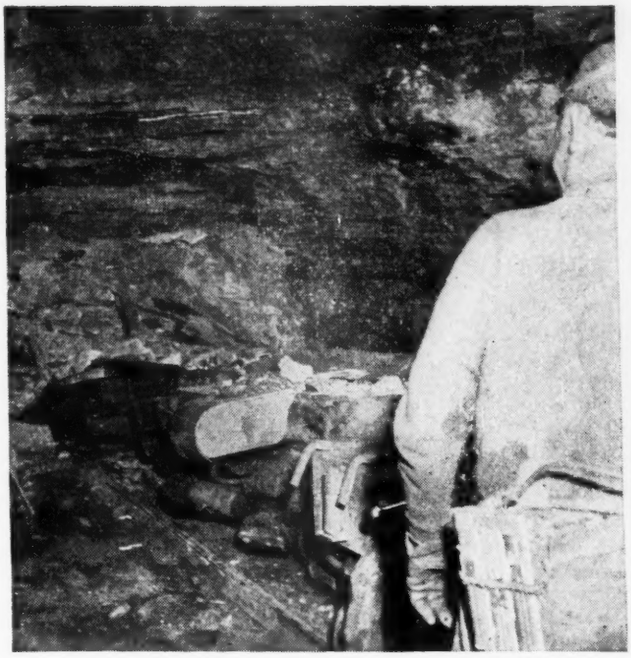
MOBILE LOADING with track-mounted equipment has been exclusively used in developing a new mine in an area of the "B" seam averaging 38 in. and dropping as low as 36 in. in places at Spangler, Cambria County, Pa. Installation of a very low-type loading machine, prefabricated track and large mine cars has made it possible to maintain an average of close to 18 tons per man-shift in the section. Ma-



MINE CAR with a total length of 19 ft. 3 in. spotted under boom of low-height loading machine.



OPERATOR RIDING on loader, which is only 28 in. high, while tramming to a new place in Springfield No. 4.



LOADING 3½ FT. of top rock in a haulway 14 ft. wide.

TOP ROCK going into 4-ton drop-bottom car in haulway.

chines loading coal and rock three shifts for 18 months have been maintained at low cost.

The mine is one of three of the Springfield Coal Corp., a Peale, Peacock & Kerr associate, in which the same low-type loading machine, the Clarkson Red Bird, is now in use. Prefabricated track, designed and made by the West Virginia Steel & Mfg. Co., is employed in four mines of the Peale, Peacock & Kerr interests.

Management and engineering of the mines is under the direction of T. L. Stafford, general superintendent; W. L. Myers, assistant general superintendent; and R. W. Scollon, chief engineer, all with offices at the operating headquarters at St. Benedict, Pa. At Springfield No. 4 mine, with which this article is principally concerned, and where the photographic illustrations were made, Clarence L. May is superintendent and James Hunter is mine foreman.

Ground was broken at Springfield No. 4 June 21, 1945. Upon completion of a rock slope to the coal in March, 1946, the first Clarkson loader was put into use. To date, development extends 5,000 ft. from the slope bottom and the Clarkson loaders, operating on the prefabricated track, have loaded a quarter million tons of coal and a tremendous volume of top rock to provide height on the haulways.

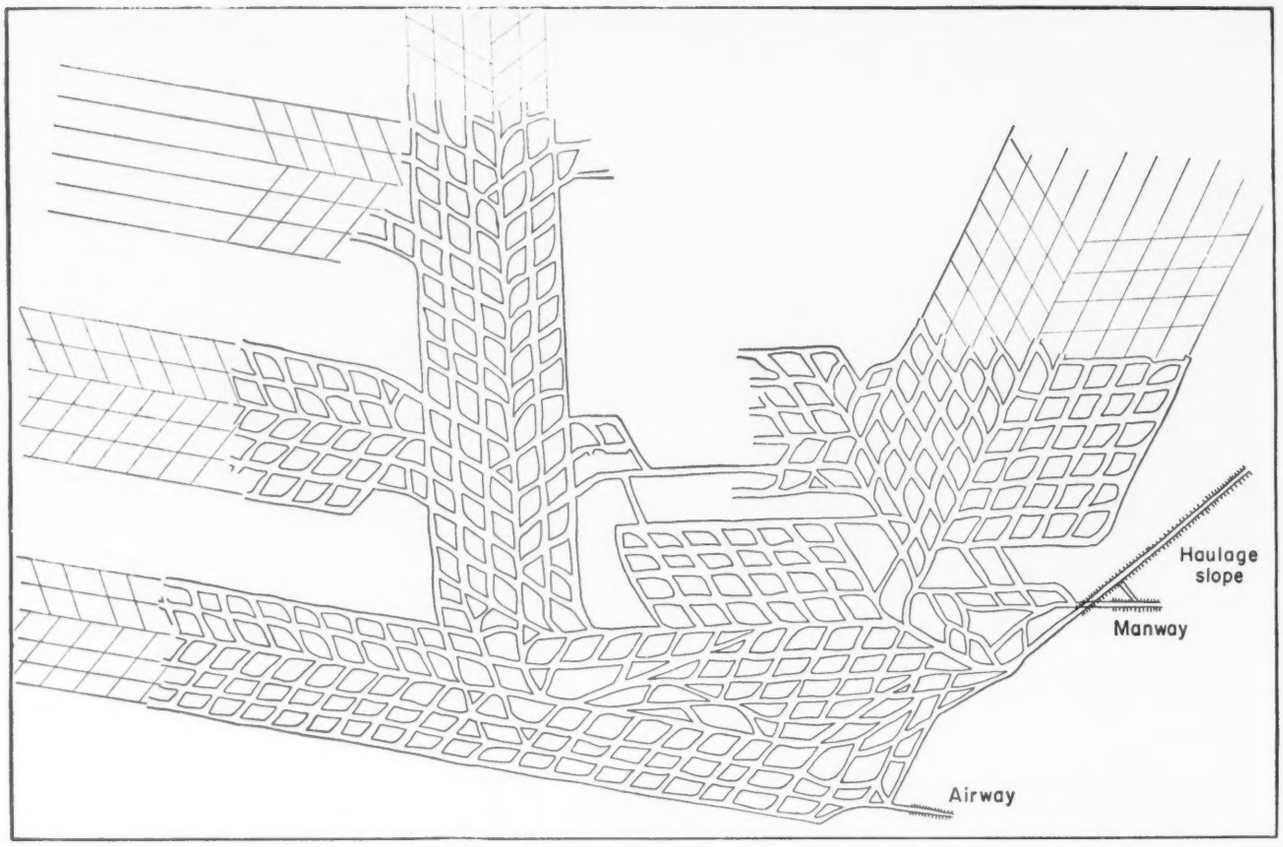
The seam, known also as the Miller and Lower Kittanning, lies practically level and has a firm slate top and fireclay bottom. Average thickness of the clean coal is 38 in., topped by bone averaging 8 in. Rope haulage is used on the entrance slope, which is 1,000 ft. long through rock on an inclination of 10 percent.

Track gage is 56½ in. and the cars are A.C.F. drop-bottom units, carrying 4 tons if topped to 4 in. Car height is 25 in., over-all width is 7 ft. 8 in. and the length over the bumpers is 19 ft. 3 in. Because of the extra car width and the low roof clearance, the standard method is to manipulate the loading machine and the car spotting to deposit the coal in the car in two longitudinal rows. One Goodman 8-ton cable-reel locomotive serves each loading machine and the maximum car-change distance is 104 ft.

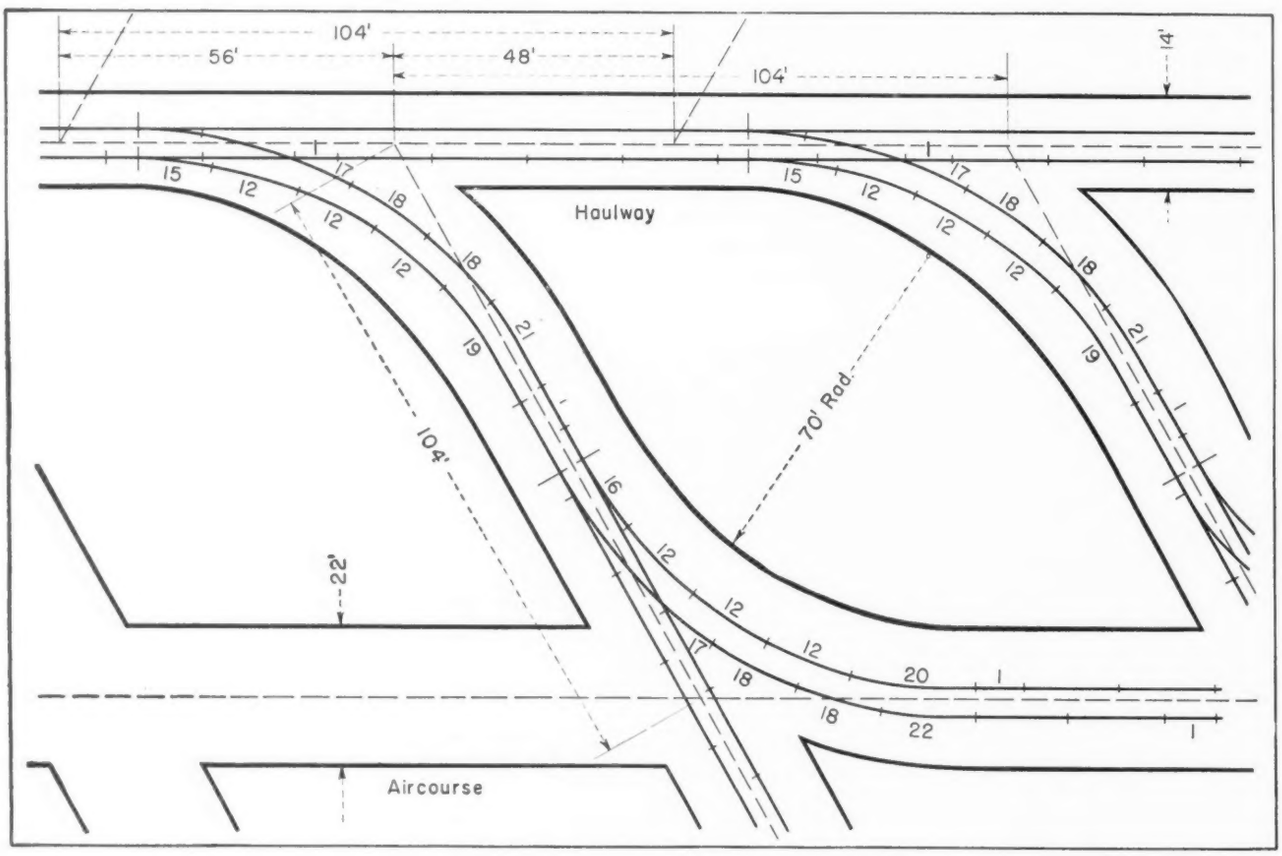
Most of the entries driven to date consist of six headings each. However, various numbers of headings are being tried. In some recent trials with as few as three working places, better tonnages per unit per man-shift were achieved. Consequently, it is now the plan to limit entries to four or five headings, except where ventilation requirements call for more air courses. Disadvantages of the system of driving six or more headings per

THE SEAM comprises 38 in. of clean coal and top cutting is done in the coal just below an 8-in. bone top. Cuts are 8 ft. deep.

MINE AND TRACK PLANS AT SPRINGFIELD No. 4

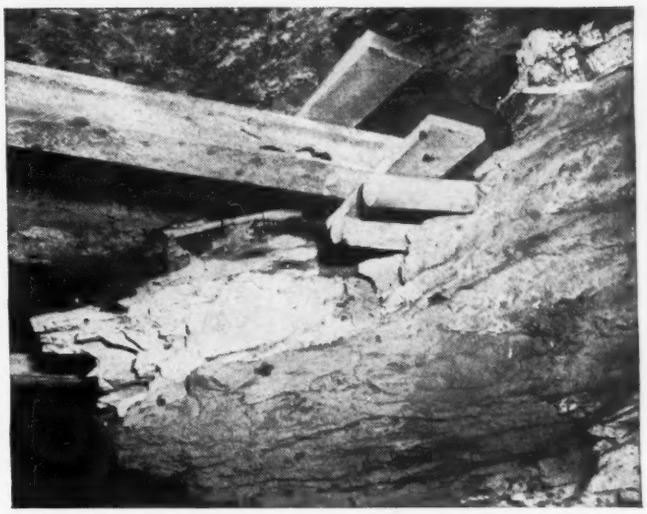


DEVELOPMENT at Springfield No. 4 mine to Nov. 1, 1947. From March, 1946, when a rock slope to the coal was completed, 245,434 tons of coal has been mined, all from development.



INDICATING POSITIONS of all but two of the eleven rail sections for prefabricated track for driving a haulway and the right- and left-hand air courses. Two other sections are required for connecting to the next right-hand air course (not shown). The straight-rail sections designated "1" are 8 ft. long. Sections not designated by numbers are 16 ft. long. Center lines only are shown for the crosscuts to the left-hand air courses.

EMPTY CAR, one of a trip of ten, being let down the rope-haulage slope. These drop-bottom cars carry 4 tons if topped to 4 in.



PERMANENT STEEL crossbars are erected to within 50 ft. of the development face. Two 2-in. steel pins are the standard support.

entry include overloading cable reels with cable and too long travel for men under low top.

Headings are driven on 90.07-ft. centers and the crosscuts are turned at a 60-deg. angle, thus making the track center-line distances, as measured along those center lines, 104 ft. each way. The haulway serving as the key room is 14 ft. wide and in it 3 to 4 ft. of top rock is taken down to provide a clearance of 6 ft. above the top of the rail. Air courses are driven 22 ft. wide, which is the reach of the loading machine. No top is taken in them.

Cutting is done in the coal just under the bone at the top. Jeffrey 29C arcwall machines are used and the average advance is 8 ft. per cut. This average must be maintained because the prefabricated track design is based on that dimension and its multiples.

No. 4 mine is equipped with six Clarkson Red Bird loaders, four of which have been in use three shifts for several months. The other two have been waiting delivery of new gathering locomotives to serve them.

Height of the loading machine is 28 in. and the length is 39 ft., including a boom long enough to load the extra-long cars. All operations of the machine are powered by one 50-hp. motor.

Officials of the company have found that the machines can be maintained at comparatively low cost. All machines have been operated three shifts loading coal and rock. One machine was taken out of service for its first general overhaul in September, 1947, and it was found in better shape than was expected considering the hard usage.

Crews consist of eleven men per unit and under normal conditions average 200 tons of coal per unit per shift.

The mine is classed as gaseous. There is a separate split of air for each mining unit and there are no doors on the mains except for a few temporary checks at the face.

Systematic development progress is attained by following sequence drawings, which have been worked out to show exactly when each cut of coal in the several headings must be taken and when each lift of top rock must be shot down and loaded out of the haulway. For a five-heading entry, 128 progressive steps are indicated on the print.

Prefabricated track was selected as the cheapest for the mine because: (1) non-skilled labor can lay it, (2) the labor of bending, cutting and punching rails is entirely eliminated—an especially important factor in low coal, (3) all parts are furnished and completely prefabricated and, therefore, the time consumed in laying track and turnouts is reduced to about one-fourth what it would be otherwise.

This West Virginia Steel prefabricated track consists of 30-lb. rails on 5-lb. standard steel ties; 5-ft.-long switches, each mounted on a set of five special switch ties; and No. 3 (70-ft. radius) turnouts with manganese frogs. Standard ties are interlaced throughout the turnout. The design has been simplified until the job requires but eleven different pieces of rail.

Switch stands with spring connecting rods were specified by the coal-company management. This eliminates manual operation of the stands when pulling cars onto the entry track.

The layout is such that a turnout may be picked up and rails substituted without altering the positions of any adjacent rails. Turnouts, curves and lengths of straight rail interchange, and so the plan applies either when more headings are added to an entry or some are discontinued. Stagger of the extremity of the rails is uniform, whether that stagger occurs at the end of a turnout on a curve or at the end of a straight-rail section. The stagger equals the machine cut of 8 ft. Any entry or room may be moved 4 ft., or a multiple thereof, in any direction in case of bad roof or other irregularities.

Permanent timbering in Springfield No. 4 is erected on the haulways to within 50 ft. of the developing face. It consists of 70-lb. rail crossbars 14 ft. long supported at each end by a pair of 2-in. pins and 1x4x14-in. steel plate.

On the main haulways the 30-lb. prefabricated track is replaced with 50-lb. permanent track. On butt entries the prefabricated track is left for the life of the entry.

Two other mines of the Peale, Peacock & Kerr interests as previously mentioned, use West Virginia prefabricated track. Places have been encountered in some of the mines where bottom is soft and planks must be used under the steel ties. Therefore, all ties of the prefabricated track are specified with spike holes punched in them.

In No. 4 mine loaded trips consisting of ten cars are pulled up the slope and over the tops of three 150-ton drop-bottom bins in series, where the dumping is done without uncoupling. The first bin is for mine rock and the second and third bins are for coal. A rope

TRIPS OF TEN drop-bottom cars are dumped into these three 150-ton bins. Railroad loading feeders are on the other side, where the main plant will be built.

IN THE MINE OFFICE at Springfield No. 4: W. B. Rankin (left), John Bilko, William Kost and Joseph Chernicky, face foremen; Paul Jones, assistant mine foreman; James Hunter, mine foreman; W. L. Myers, assistant general superintendent; and Clarence L. May, superintendent, No. 4 mine.

DISCUSSING LUBRICATION of loading machines in Springfield No. 4 mine: W. L. Myers (left), assistant general superintendent, Peale, Peacock & Kerr companies; Sheldon Jones, mine-lubrication engineer, Socony-Vacuum Oil Co.; Clarence L. May, superintendent, No. 4 mine; and W. B. Rankin, face foreman.

rider sets up the tripping devices to dump any rock cars into the first bin and to dump the coal cars in either of the other two bins. Total length of the rope haul is 1,200 ft. The bins are permanent but the premanent tipple is yet to be built.

Up to Nov. 1, 1947, coal production at this new Springfield No. 4 mine had totaled 245,434 tons, all handled by the Clarkson loaders and all from development work.

The mine slope is, for the most part, through solid rock, which required no timbering. Water trickled from the roof in many places and proved a nuisance. Last fall it was effectively sealed off by pressure grouting through holes drilled from the surface. The work was done by Hoffman Bros.

Other mines of the Peale, Peacock & Kerr interests using Clarkson loaders include Springfield No. 5, Springfield Coal Corp., Thomastown, with one machine put into use in June, 1946. By Nov. 1, 1947, it had loaded 70,250 tons of coal. At No. 5, mining consists of taking 28 in. of clean coal and 16 in. of bottom rock. No. 5 had been a hand-loading mine and in that work, also, 16 in. of bottom was taken in rooms. Now the whole mine is being changed to mechanical loading. Track gage is 36 in. and prefabricated track is being installed as the loaders are put into use. The second Clarkson was scheduled to go into service at No. 5 in November, 1947. Rotary drills for drilling coal and jackhammers for drilling rock are supplied air by a Cantrell mobile compressor.

At a brand-new operation, Springfield No. 6 mine, of the Cambria Clearfield Mining Co., West over, two Clarkson machines are on hand. However, up to Nov. 1, 1947, there had been room for only one to operate. Coal tonnage loaded to that date was 2,238 tons. This mine was opened by making an open cut with a power shovel, after which the Clarkson started digging in. Up to Nov. 1, it had developed a four-heading entry to 600 ft. The seam is the "C," or Upper Kittanning, ranging from 40 to 60 in., including a 5-in. binder 16 in. from the bottom.

The binder in Springfield No. 6 mine is cut out by a Jeffrey 29C arcwall, altered by a gooseneck designed and built in the coal company shop. Gage is 56½ in. and prefabricated track was introduced at the start. The same type of coal and rock drills and mobile compressor are used as in Springfield No. 5.

Common Types of Cables Used in Coal Mining

Type	Usual Use	Service Conditions or Hazards	Important Design Features	Remarks
Single-conductor	Locomotives; motor leads	Reeling; pulling; runovers; twisting	Good adhesion between insulation and conductor, and insulation and jacket	Sheaves and guides should be placed to reduce twisting
Two-conductor flat-twin (Types W and G)	Loaders; cutters; shuttle cars; locomotives	Reeling; pulling; runovers; twisting; crushing and impact	Good adhesion between insulation and jacket	Good runover resistance; minimum space on reels; flat ground wire between conductors on Type G; sliding of conductors when bent on major axis not recommended
Two-conductor concentric	Locomotives; shuttle cars	Reeling; pulling; runovers; twisting	Good adhesion between insulation and conductor and insulation and jacket	Not as resistant to runovers as flat-twin; flex life also less; twisting should be kept to a minimum
Two, three- and four-conductor round (Types W and G)	Cutting; loading; shuttle cars	Reeling; pulling; runovers; twisting; crushing and impact	Good adhesion between jackets	Good flex life and can resist runovers well; Type G has ground wire in interstices; requires more reel space than twin or concentric

G. J. Crowdes, Simplex Wire & Cable Co.

Better Service From Cables

Lengthening Trailing-Cable Life Starts With Buying the Proper Type and Size—In Service, the Cable Should Be Protected Against Overloading, Overheating and Mechanical Damage—Good Splicing Essential

THE USE of heavier equipment in both thick- and thin-seam mining, plus the pressure for higher output per machine, have placed extra burdens on trailing cables, thus tending to shorten their life. Some of the things that cable and equipment manufacturers and mining companies can do to improve cable service life are presented in the following material, a summary of points brought out by a panel of experts at the Mining and Metal Industry session, American Institute of Electrical Engineers, Pittsburgh, Pa., Jan. 30. Subjects and authors were:

"Discussion of Electric-Cable Practice in Coal Mines of Illinois," C. C. Conway, The Consolidated Coal Co.

"Mechanical Problems of Trailing Cables on Mobile Mine Machinery," C. B. Peck, Jr., Anaconda Wire & Cable Co.

"Safe Use and Installation of Electric Cables in Coal Mines," T. R. Weichel, U. S. Bureau of Mines.

"A Machinery Manufacturer Looks at Cable," Frank R. Hugus, Joy Mfg. Co.

"Improvements in Mining-Machine Cables," R. A. Schatzel, Rome Cable Corp.

"Essential Characteristics of Design and Material for Mine Trailing Cables," G. J. Crowdes, Simplex Wire & Cable Co.

Conductor size and mechanical strength are two of the more important factors to be considered when ordering trailing cables, especially if they are to be used on more than one type of machine. The horsepower rating of the machine to which the cable is to be applied should be the basis for determining the current requirements for the cable. A cable replacement involving a smaller conductor than that originally supplied on the equipment, to effect a saving in cost or to get more on a reel to match the needs of a new mining plan, will likely result in an overworked cable.

It is an accepted fact that more portable cable is burned up or cooked than is worn out mechanically. The current rating for a unit of electrical equipment—be it a motor, resistor or cable—is based on its ability to dissipate the heat generated within it while it is doing its job. Temperature limitations are based upon what the insulating compounds will withstand. To prevent deterioration and shortened cable life, cable temperature should be limited to approximately 220 deg. F. As a rule, permanent damage results when cable temperature exceeds 300 deg.

Manufacturers' cable-data sheets list current capacities for trailing cables based on a conductor rating of 75 deg. C. and an ambient temperature, or temperature of the surrounding air or other cooling medium, of 40 deg. C. (104 deg. F.). If the mine temperature is 68 deg. F., a correction factor of 1.25, according to one reference source (another gives 1.41), may be used, thus increasing the allowable cable loading.

It should be noted that the correction factor for ambient temperature applies to a cable exposed to a given surrounding medium; in this instance, the mine floor. It does not apply when the cable may be heaped in a coil or reeled in several layers on a drum. When cables are used with one or more layers wound on a gathering reel, current-carrying

capacities are reduced as follows: one layer, 15 percent of the original value; two layers, 35 percent; three layers, 55 percent; four layers, 65 percent.

For flexibility and long life under bending and flexing, fine stranding is necessary. Small strands last longer before fatigue failure results in a break. Mine cables usually are assembled in rope form; that is, bunches of strands are assembled symmetrically. The number of strands varies from 49 for No. 8 to as many as 427 for 4/0.

Reel Tension Affects Cables

The larger the conductor, the greater the mechanical strength of the cable. However, in some applications, the current requirements are low but the cable is subject to a high working tension. Excessive cable tension, for example, has resulted in cable failure on small-conductor cables, such as the No. 6 or No. 4 used on shuttle cars. The tension, set high enough to be effective as the reel fills up, increases as the reel empties because of the decrease in coil diameter. Excessive cable-reel tension has stretched some cables as much as 10 percent and changed the temper of the copper from soft to medium-hard. Manufacturers of mining equipment have recognized this problem and recently have developed a hydraulically operated reel to assure uniform tension.

Replacement of natural rubber sheathing with synthetic in recent years has improved the physical properties of trailing cables from the standpoints of strength, elongation, toughness and abrasion resistance. Synthetic sheathing material has rather poor dielectric properties but it is flame-, oxidation- and acid-resistant, withstands sunlight and weather and is tough. Toughness, in fact, is pointed to as its greatest advantage over natural rubber. Tests and study of a number of cable failures by one manufacturer failed to show any instance where synthetic sheath failure was responsible. The poor dielectric strength of synthetic does not preclude its use as jacket material since the individual conductors are covered with compounds having good insulating properties.

Many mining companies want to know what cables are recommended for off-the-track applications where the cables are subject to being crushed by pneumatic tires or crawler treads. This crushing has a tendency to force the copper conductors together, causing a short circuit. The parallel-type cable is reported to withstand crushing better than either the concentric or the multiple-conductor round cables with the conductors twisted (Type W). Parallel-conductor cables lying flat on the mine floor better resist conductor-to-conductor shorting.

The federal mine safety code which went into effect July 29, 1946, calls for more-effective grounding of portable equipment. In general, it has meant using cables with more conductors. Now, all electrical equipment, to conform to the code, must have metal frames and castings grounded. This may be done through the track where the track is bonded, or through grounding conductors bonded to the track. Three-conductor cables, or two-conductor types with grounding conductors, meet the requirements for grounding off-the-track d.c. equipment, and two-conductor cables for on-track units. For grounding off-track three-phase equipment, four-conductor cables or three-conductor types with ground wires are specified in the code.

The purpose of grounding, is, of course, to provide better protection against electrical shock, particularly from off-track units. The addition of a special ground conductor in the conventional round cable requires an appreciable increase in over-all diameter. In the flat-twin, or so-called parallel-duplex, cables used on rubber-tired coal cutters, loaders and so on, the grounding, or third, conductor has been added by using a compressed, flat, bare, flexible conductor between the two insulated power conductors with only a slight increase in the major-axis width of the cable.

Breaker Protection

Another flat-twin cable with a ground conductor is now in experimental use in a few mines. This design includes a concentric grounding conductor with bare wires applied spirally over the insulation of one of the power conductors. When this concentric grounding conductor is placed around the positive conductor, it is in position to be used with an instantaneous safety ground-current tripping device (circuit breaker) for removing power from a faulted cable (*Coal Age*, October, 1946, p. 81).

New and improved mining equipment, better cable and increased attention to maintenance at the mines have helped to lengthen the life of trailing cables, according to one manufacturer. However, he contends, much of the future improvement in cable life will result from greater emphasis on proper installation and maintenance. Therefore, in the end, aside from occasional manufacturing flaws, the mining company can expect to get out of a cable about what it puts into it in the way of proper installation and maintenance.

Shorter Cables Desirable

One method of reducing possible mechanical and electrical damage to trailing cables is to use a mining plan that requires only moderate cable lengths. Long trailing cables mean extra voltage drop, reducing the terminal voltage at the machine below the proper value. Added voltage drop is a sign of heat stored in the cable. Factors contributing to the overheating of cables are: (1) cable too small for the normal current load; (2) abnormal current load; (3) multiple shifting of equipment; (4) poor splicing; (5) multiple layers on reels or in piles; and (6) low voltage.

Some figures showing the effect of coiling cable on a reel on permissible current-carrying capacity were given previously in this report. A more detailed explanation of the reasons is given in U. S. Bureau of Mines Bulletin 357, as follows:

"1. If there are three or more layers of cable on a reel, the outside layer and the layer next to the reel drum prevent free transfer of heat from the inner layers.

"2. The maximum temperature of the cable on a reel is at the center of the winding and is practically independent of the number of layers on the reel, provided there are three or more.

"3. If a cable is overloaded, it heats quite quickly to a damaging or dangerous temperature, and this temperature is practically independent of the type of cable and reel used.

"4. The effect of excessive temperature is not generally the same on different makes of cable but these differences are not apparent until the cables are damaged so that they are practically useless for further service.

"5. To avoid destructive overheating of two-conductor trailing cable on the reel, assuming that there are five layers on the reel and that the current flow is intermittent—10 minutes on and 15 minutes off—the current should not

exceed the following values: 60 amp. for No. 4 cables, 75 amp. for No. 3 cables and 90 amp. for No. 2 cables.

"The corresponding limits for Nos. 3 and 4 cables are: No. 3 cable, a 25-hp. 250-volt motor or a 50-hp. 500-volt motor; No. 4 cable, a 20-hp. 250-volt motor or a 40-hp. 500-volt motor."

When machines are triple-shifted, the cables have an opportunity to cool off only during the idle periods. It requires 10 to 15 hours for the hottest part of a five-layer reel of cable to cool to room temperature after the power has been cut off. The portion not on the reel requires 50 minutes to cool to room temperature. If cable reels are not used, the cable should not be coiled in a large pile while the equipment is in operation. Instead, it should be stretched out or hung in large loops to insure adequate ventilation. One mine supports the cables on pegs in the rib spaced 12 ft. apart.

Anchoring a shuttle-car cable is an important installation problem. If it is anchored at an intermediate point on the run, the cable is subjected to jerks when passing this point. With possibly 400 lb. of cable on it, the reel has considerable inertia and cannot be reversed instantly. Therefore, the cable must absorb the shock and in time must either stretch or break. Such a condition has been responsible for broken ground wires in parallel-type cables.

Splicing a Problem

Regardless of the care taken in the installation of a cable, there follows a period of maintenance. Splices eventually must be made. In each instance, the first splice usually is a temporary one. Usually, the splicing of a cable is a question of time vs. mechanical and electrical perfection, with time generally winning out. The demand still is for a better mechanical splice—one that is short enough to permit bending of the cable on the reel and which can be made quickly.

Poor splices are, in themselves, a source of heating. Unless the strands of the conductor at the splice are held together under considerable pressure, these points of contact will heat as the cable is loaded. Failure of some splices has been the result of breaking of conductor wires through (1) sharp bending at the ends of the soldered area and (2) tension resulting from failure to carry the spiraling of the conductors through the splice in triplex or twisted duplex cables. A recent survey at a number of mines revealed that the limit on the number of temporary splices in a single trailing cable varied from two to seven, the average being four. Grounding wires complicate the splicing of trailing cables and the importance of splicing them, as well as the conductors, is not yet fully appreciated by those responsible for making the splices.

Many feel that the permanent vulcanized splice must replace the temporary splice. The place for making this permanent splice is in the shop where the proper materials are available and the splicer has ample time to make the connection and vulcanize the cable. Increased use of plugs and receptacles, which must be vulcanized to the cable, are offering some new problems to the manufacturer. The compounding of the cable jacket must be correct for proper bonding with the plugs and receptacles.

Standardization Offers Savings

Standardization of cable outside diameters, now being worked out by the Bureau of Mines, I.P.C.E.A. and N.E.M.A., is important to both manufacturers and mining companies. It will permit stocking a smaller variety of insulated bushings, stuffing boxes and packing-gland nuts where permissible equipment is involved. More information is necessary, in the opinion of some men, on voltage drop and cable life for certain values of current through the cable. In addition to the Bureau of Mines run-over test and the Pennsylvania Department of Mines flame-propagation test, other standardization tests are seen as necessary for electrical, thermal, mechanical and chemical properties.

Standardization, according to one authority, has made little difference in the diameters and sheath thicknesses of round cables. On flat-twin types, the reduction in dimensions and sheath thicknesses will permit the winding of 20 to 25 percent more cable on the same reel. However, the trend toward reducing cable dimensions, including the use of smaller conductors, invites more mechanical and electrical difficulties. Smaller conductors bring about more destructive heating from overloads and result in excessive voltage drops. All in all, however, the principal factors in the design of mine trailing cables, according to some experts, still are mechanical rather than electrical.

Summing up, the important points in promoting safety and low cost in cable use, from the standpoint of the mine operator, include:

1. Purchase cables with conductors having ample capacity to carry the required current without overloading and overheating.

2. Keep voltage in the working sections up to standard.

3. Keep bonding up to standard and provide adequate returns.

4. Splice properly and vulcanize. Splices should be strong electrically and mechanically and should be well insulated with materials suited to the cable type. The number of temporary splices should be limited and when that limit is reached the cable should be taken out of service and the splices made permanent by vulcanizing. Conductors should be spliced or joined so that they are mechanically and electrically secure without solder and then, unless an approved splicing device is used, they should be soldered with a fusible metal or alloy, or brazed or welded. Sharp edges and points should be avoided in soldering, welding or brazing. All joints and free ends of conductors should be covered with insulation equal to that on the conductors.

5. Protect cables from mechanical damage. Place cables where they cannot be run over, anchor cables to prevent jerking, avoid severe twisting and kinking, take precautions against cutting, protect against falls and keep cable tension down.

6. Avoid overloading of cables.

7. Avoid overheating. Do not overload. Keep cables as short as possible. Where possible, as in conveyor work, sectionalize the cables into short lengths, giving due thought to safety in the type of cable connectors selected. Long single cables, such as are used in conveyor mining, should be stored in long, loose loops, preferably on the mine floor, since loops on the rib add to the difficulty of fighting any fire that might occur. Do not pile cable in tight coils. On such equipment and mining and loading machines equipped with reels, attach the nips far enough back to spool off the cable. If that is impracticable, unreel the cable and spread it out on the bottom.

8. Protect cables with fuses or circuit breakers of the proper rating for the service.

9. Use junction or distribution boxes for making multiple power connections in working places.

10. Use flame-resistant cables wherever possible.

WALKING DRAGLINE stripping 45 ft. without benching at Wolf Creek No. 5 pit.

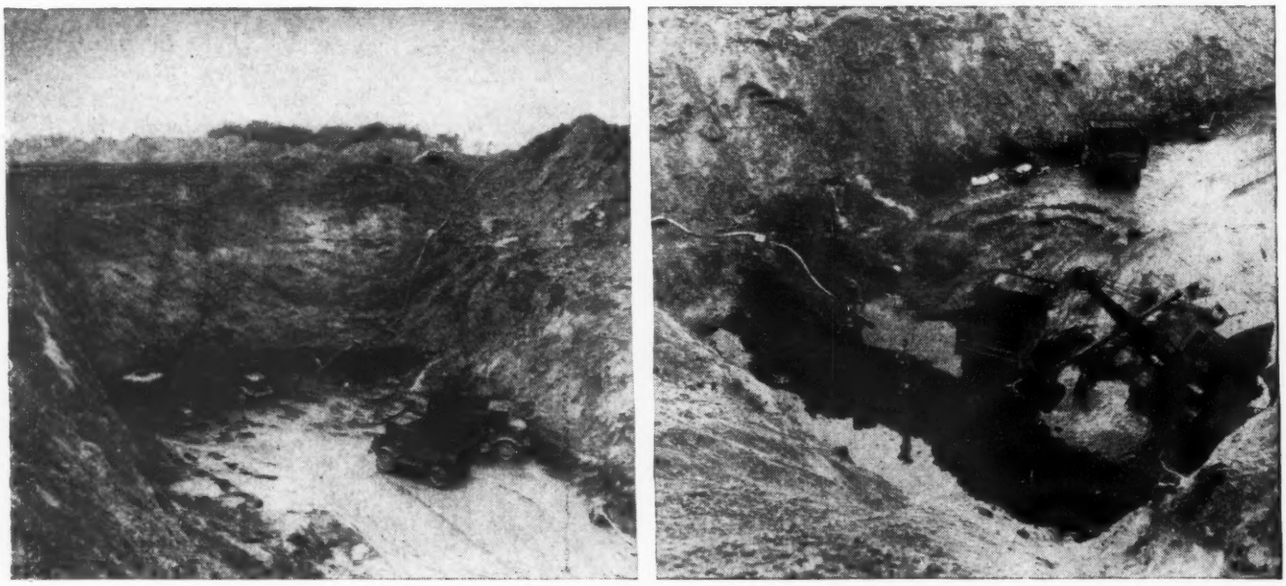
Modern Costing Helps Stripper

Development of Simple Yet Accurate Accounting System Raises Stripping Efficiency and Cuts Losses — Advance Planning Assures Low-Cost Operation and Maximum Recovery—New Shop Includes Floor-Slab Radiant Heating

By J. H. EDWARDS
Associate Editor, Coal Age

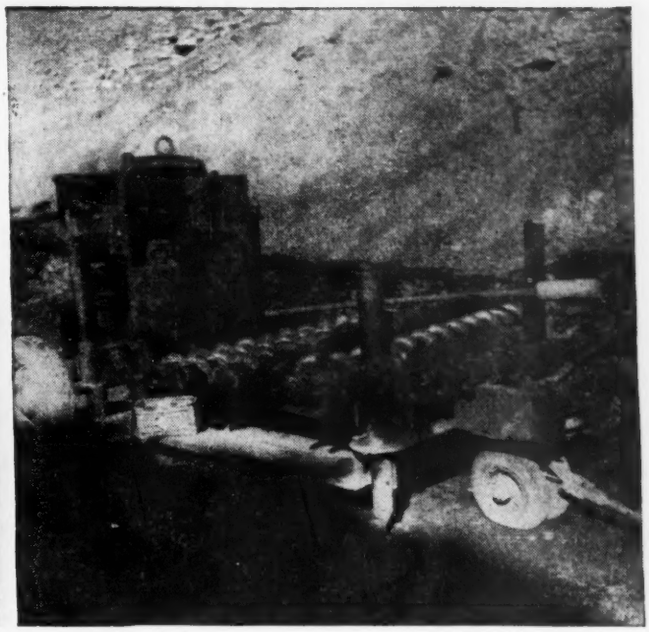
ACCURATE DATA on stripping costs and results, provided by a modern cost-accounting system developed to meet the particular needs of the management, have contributed to high efficiency and a substantial reduction in losses at the properties of the Geo. Bobo Co., Grove City, Pa.

The operations of the Bobo company center around the career of Geo. Z. Bobo. Some 16 years ago,



LOADING LAST COAL at the end of Wolf Creek No. 5 pit (left) with a ¾-cu.yd. shovel. The 40-ft. overburden was dug without benching or shooting. Water is a serious problem. At the right, a 3-in. gasoline pump is pumping over the highwall.

BULLDOZER clearing away for dragline.



SIDEWALL DRILL in Wolf Creek No. 5 pit.

at the age of 21, he began on a small job in Kentucky with an old rented shovel. The personnel of the budding enterprise consisted of himself and a partner, Albert Bango. They stripped half the night by lantern light, loaded the coal the next forenoon and spent the afternoon repairing equipment and bringing up supplies for the next gruelling 16-hour cycle.

The partners gained experience fast—the hard way. They soon moved to other fields, their jobs including several in Ohio, and finally went into Pennsylvania. The partnership was dissolved in 1944 and the Geo. Bobo Co. was organized immediately thereafter as a sole proprietorship. The new company, although relatively small at first, expanded rapidly. Operating at the outset with rented equipment, it began buying machinery as fast as deliveries could be made. It now owns all the equipment used on two large jobs and several smaller ones, in addition to a fleet of trucks, four loading ramps, three tipples and a large, completely equipped repair shop. In addition to this expansion of the parent company, Mr. Bobo also has organized several others whose activities tie in with or supplement those of the Bobo company proper. These include:

The Domestic Coal Co., Stoneborough, Pa., sales agency.

Bobo & Parrish, operating near Butler, Pa.

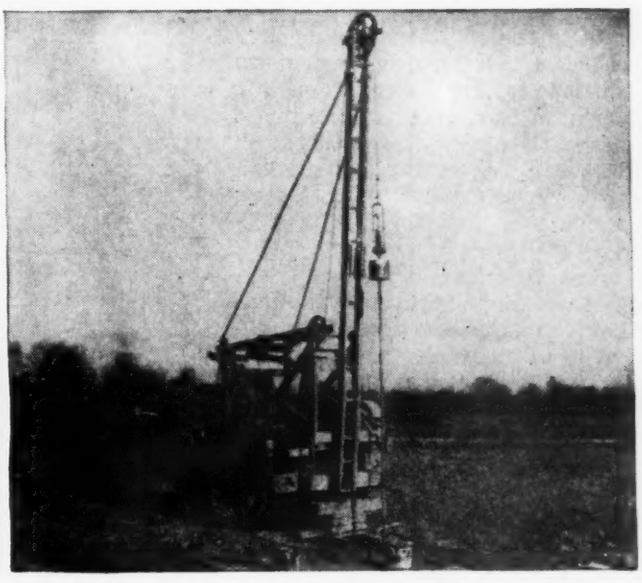
Bobo & Denham, operating near Willamsburg, Ky.

Motor Headquarters, Grove City, Pa., car, truck and garage business.

Bobo, Collings & Taylor, Tennessee (being organized).

No claim for following any particular theory in building up his organization is made by Mr. Bobo, but his idea perhaps could be

NEW SHOP, now completed, in the construction stage. Pipes in the floor slab supply heat where needed.



THIS CHURN DRILL for prospecting is mounted on a half track with a winch in front for extra-tough going.

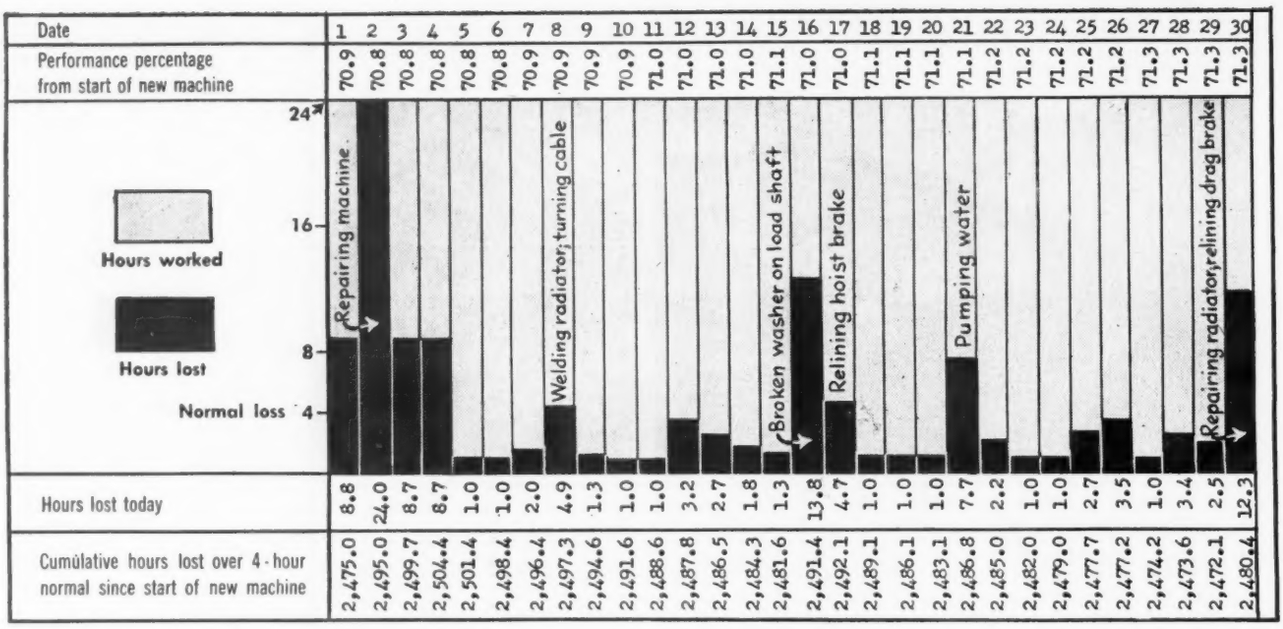


CHART SHOWING DRAGLINE PERFORMANCE in terms of time lost and spotting both machine and management deficiencies. This graph is typical of several regularly prepared.

summed up in the words, "The best is hardly good enough." In any event, whether men or methods or machines are involved, only the best available is acceptable. As an example, he decided some four years ago that he needed a completely modern system of cost accounting. To this end, he engaged the full-time services of Dr. W. Collings, at that time head of the Department of Accounting at Grove City College. The assignment was set up in these words: "I don't like to waste time on figures. So set me up a system that is simple first of all, but complete and accurate and showing end results that I can understand." Mr. Bobo got his system, which will be analyzed later on in this article.

Along similar lines, the company needed a field superintendent in addition to the foreman on the ground at each plant, to coordinate the rapidly growing activities at all the jobs. Something better than just a "good man" was Mr. Bobo's specification. And for this task he chose youthful H. D. Taylor who, as warrant officer in the army, had made an enviable record in handling the diverse and scattered activities of many men and the problems of large masses of materials and heavy machinery.

Notwithstanding the help of many able assistants, including Hollie Smith, pit superintendent on the Page job; Noble Rains, in charge of a Manitowoc 4500; and Mr. Hodge, in charge of drilling operations, Mr. Bobo spends much of his time out at his various properties or in his new shop. His forte is the practical and he boasts a sure memory for operating and mechanical details. He knows the story of almost every tool and machine used at his plants—make, model number, price, location, etc.

Natural conditions and equipment in the pits at or near Grove City are as follows:

West Sunbury

Lower Kittanning seam, 40 in. of coal with 15 to 20 ft. of cover. The country is hilly, the seam rising more or less with the slopes, facilitating spoil disposal and reducing the drainage problem.

1 Lima 1201 stripping shovel.
1 Northwest 25 loading shovel.
1 Hough sweeper.
1 International HD-10 tractor.
1 Caterpillar D8 tractor with bulldozer.
4 International KR 11 10-ton dump trucks.
2 8-ton Mack trucks, also for coal hauling.
1 pick-up service truck, formerly a weapon carrier.

Wolf Creek No. 5

Brookville seam, with 35 to 40 ft of overburden and fairly level ground. The strippable area takes in several hundred acres of coal 4 to 6 ft. thick. The drainage problem is substantial.

1 Page 618 walking dragline, 110-ft. boom with 5-cu. yd. Page automatic bucket.
1 Manitowoc 1¼-cu. yd. coal-loading shovel.
1 McCarthy sidewall drill.
1 Caterpillar D8 tractor with bulldozer.
1 Galion grader.
5 International Army-surplus coal-hauling dump trucks, 10 tons, cab-over-engine.

Old Stone House No. 1

Brookville seam near Slippery Rock, 40 in. of coal under 15 to 20 ft. of overburden. The land is fairly level but with sufficient slope to eliminate drainage problems.

1 Manitowoc 3000 2½-cu. yd. stripping shovel.
1 Lima 30¾-cu. yd. loading shovel.
1 Caterpillar D8 tractor with bulldozer.
Coal hauling contracted.

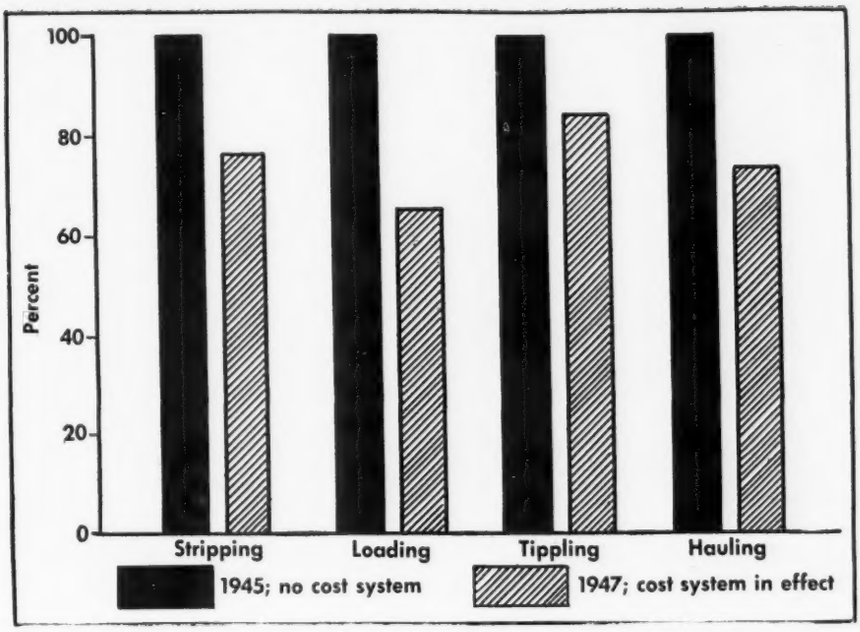
Old Stone House No. 2

Brookville seam, 48 to 60 in. of coal under about 35 ft. of cover. The ground is rolling, the coal seam rising and falling with the surface.

1 Manitowoc high-lift shovel, 5-cu. yd. dipper and 120-ft. boom, the outer 75 ft. of which is aluminum. The drive consists of two G.M.C. diesel engines bolted together.

1 Manitowoc 3500 3-cu. yd. shovel (on order) to be used in tandem with the preceding high-lift unit.

1 1½-cu. yd. loading shovel (on order).



COMPARISONS of Geo. Bobo Co. operating costs with and without cost system. Savings would have been even greater if adjusted for rises in wages and cost of materials.

1 D8 Caterpillar tractor with bulldozer.

1 D10 Caterpillar tractor with bulldozer.

Jackson Center

Equipment for this job is being assembled, but no work has been done as a result of delays in deliveries. The Brookville seam, 48 to 72 in. thick and covering several hundred acres, will be recovered. Cover thickness ranges up to 70 ft. The main machine will be a 15-cu. yd. dragline, on order for several years and which is expected to be shipped shortly.

In view of this diversity in operations, it becomes apparent that any system of accounting separating the costs and operating results on each job requires careful planning. It was desired that the efficiency of each machine, each job and each of the successive operations, such as stripping, loading, hauling and tippling, be put on a comparative basis. The purpose, naturally, was to compare the efficiency of one job with that of another and one type of machine or one method of operation with another. The result was a three-dimensional system for each job that was rather simple to apply but yielded the following information from one single-basis record:

A. By Elements of Cost

1. Depreciation.
2. Gasoline, grease, oil.
3. Mine expense.
4. Mine wages.
5. Rentals of equipment.
6. Maintenance, repairs, parts.

B. By Units of Equipment

1. Shop and service.
2. Draglines and strippers.
3. Shovels (loaders).
4. Scrapers and sweepers.
5. Graders.
6. Bulldozers.
7. Drills and compressors.
8. Pumps.
9. Dump trucks.
10. Tipples.
11. Loading docks.

C. By Basic Operations

1. Stripping, including all associated items, such as clearing, drilling, shooting, etc.
2. Loading, including associated items such as shooting, sweeping, pumping, etc.
3. Tippling, including grading, cleaning and screening.
4. Hauling, including road building.

With the aid of these cost breakdowns, leaks were discovered and eliminated and particularly good or bad results were highlighted. Some surprising results were obtained in a matter of months. On one job, unusually large thefts of gasoline were discovered and stopped. On another, it was found that coal hauled out of the pit never reached the tipple. This was stopped by a comparatively simple checking system. Again, an "Idle Time" record indicated large losses as a result of running off the coal seams, which was promptly remedied by setting up a drilling department in charge of a competent engineer. It was learned how much per hour it cost to shut down the big dragline and the result was better planning and maintenance, which materially increased its efficiency.

Inspection of the accompanying graph of operating costs shows that the accounting system achieved its greatest saving in items making up the loading cost. Hauling was next in the percentage of improvement. Stripping, which is the big item in cost, was reduced 15 percent. In reality, the reductions were greater than those shown because increases in wages and costs of materials were not adjusted for.

The dragline graph also shown is characteristic of the several graphs regularly prepared. Four hours time out of the 24, or 83-percent time efficiency, is considered normal performance. In this particular month—April, 1947—the machine was down 130.2 hours out of 720, an operating efficiency of 82 percent. The line of figures at the bottom of the graph indicate that the average efficiency for the month was below normal. They show a slight increase in abnormal cumulative lost time.

The graphs were designed so that the girls of the office force can do them on standard typewriters without the necessity of hand ruling or lettering. By using two-color ribbons and typing a series of capital letters in a row, the graphs are made to show costs and comparisons at a glance. Haulage cost is represented as follows:

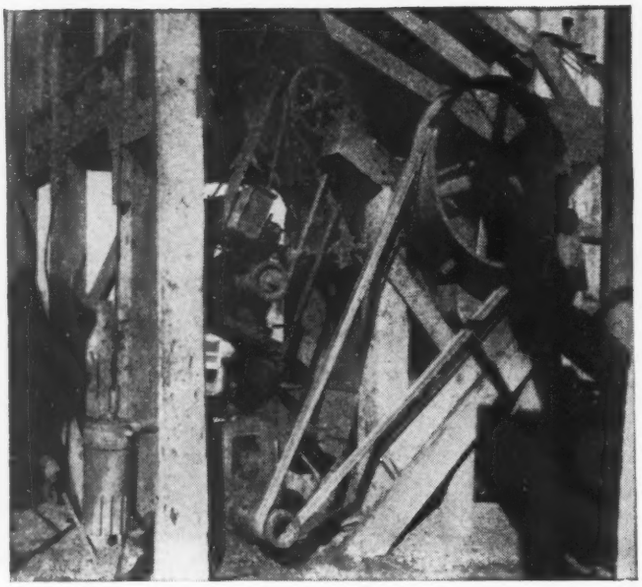
HHHHHHHHHHHHHHHH

Stripping cost thus:

SSSSSSSSSSSSSSSSSSSSSSSS

Each letter represents a certain sum of money so that the actual costs are given in round numbers.

In the section of Pennsylvania in which the Bobo organization operates, the areas being stripped are, in general, poor farming land. The value of surface without farm buildings and without residential-lot possibilities usually ranges from $40 to $100 per acre. Coal tracts of 100 to 200 acres usually are the largest that can be secured for a single operation because the coal is not continuous and some farmers will not sell. As a rule, the coal areas lie in river valleys and are a half to several miles wide. In the vicinity of the new Jackson Center pit, however, where the cover is



AIR-COOLED gasoline engines (center and bottom) drive tipple equipment at the Bobo operations.

NATHAN LEAN (left), oiler, and Hollie Smith, foreman, pose with one of units at Wolf Creek No. 5 pit.

deepest, the seam is rather regular and may be continuous for 8 to 10 miles.

It is a company policy that a shovel is not put to work in a pit until the drilling, surveying and planning have been done to (1) determine the area of the coal, (2) establish the depth and character of the overburden, (3) determine the analysis of the coal, (4) plot levels and slopes, (5) determine and plot drainage and (6) explore the possibilities of access roads.

With its own core- and churn-drill outfits, the Bobo organization puts down holes on 200- to 300-ft. spacings to establish the crop or boundary line, then spot drills every 1,000 ft. or so, taking cores for analysis. Two drills are used at the Pennsylvania operations. The newest is a Speed-Star Model 240 unit, made by the Star Drilling Machine Co., Akron, Ohio, and mounted on an International army half-track with a winch on the front.

Drainage Studied in Advance

The preliminary engineering work includes preparation of a drainage layout and estimates of the yardage to be removed and the tonnage of coal recoverable. Because water constitutes the most difficult problem, the working method and location, as far as drainage is concerned, are fitted to the seasons. Work is done on higher ground in the fall and spring, and in the valleys in summer and winter.

Freezing is the ally that makes it profitable to work some of the valley ground in winter. In this section of Pennsylvania, there are many zero days and the temperature may drop to minus 20 deg. several times each winter. After the surface of the ground is frozen to a depth of a foot or so, coal can be mined which it would not be profitable to recover otherwise.

While, for the most part, the cover is glacial drift, there are spots where the overburden includes strong rock that must be drilled and shot. In the Wolf Creek No. 3 pit, where the Page walking dragline is working and where the accompanying photographic illustrations were made, about one-third of the territory had to be shot to break up 10 to 20 ft. of rock.

Six-inch horizontal holes 70 ft. deep are drilled with a Salem Tool Co. McCarthy rock-boring machine powered by a Wisconsin 3½x4 four-cylinder V-type air-cooled gasoline engine. Shooting is done with du Pont Red Cross 40-percent dynamite.

Water formerly was pumped out of the pit by 3-in. Jaeger Super Prime centrifugals. However, two additional 6-in. and one 8-in. diesel pumps are now held in reserve for severe conditions.

A Caterpillar D8 bulldozer working ahead of the walking dragline clears away trees, brush and stumps and levels the ground. It pushes the trash, stumps and dirt over the edge of the highwall and into the pit where the coal has been removed. The dragline strips 35 to 40 ft. of cover without benching. A depth of 55 ft. was stripped at one time, whereupon the dragline first benched the highwall down 20 ft. and then worked back on that bench to remove the remainder. This pit is 2,500 ft. long. The coal is 3½ ft. thick.

In the other Pennsylvania pits of the company, less shooting is required. Consequently, as a whole, only about 10 percent of the yardage must be shot.

The state requires that a bond of $200 per acre be put up to assure reclamation of the land. Little resurfacing has been done by any strippers as yet, as the constitutionality of the law was challenged. However, on Jan. 15, 1948, the State Supreme Court upheld the law and strip-mining companies are now hastening to comply.

Dragline Capacity Enlarged

The Page walking dragline, which went into service in January, 1945, and is equipped with electric swing and a Page 5-cu. yd. automatic bucket, was improved in 1947 by replacing the original diesel engine with a more powerful unit, thus increasing yardage output and promising lower engine maintenance. The new engine is a Cooper-Bessemer 300-hp. 700-rpm. 9x10½ V-type (EV-6) unit, which was built in Grove City by the Cooper-Bessemer Co.

Railroad loading is done in four places at the present time: (1) a ramp at Grove City, (2) a ramp with a housed-in apron-conveyor picking table and crusher at Harrisville, (3) a ramp with a rubber belt at Sunbury and (4) a tipple at the Braine & Heasley mine.

H. D. TAYLOR, field superintendent, with W. Collings, general manager, in the air-conditioned general offices.

GEO. BOBO with one of the two company aircraft—a four-place plane with tricycle landing gear.

Production during 1947 was maintained at a rate of about 1,700 tons per day. Of the 1947 total, about 40 percent went to the domestic market, with a peak of 90 percent during January and February. This market falls to about 10 percent during the summer but fortunately the Lakes then absorb the remaining 90 percent.

At the pit being opened at Jackson Center, there is an old tipple which will be modernized. Mr. Bobo used this tipple some years ago when doing some previous stripping in that vicinity. In tipples and at ramps where machinery is installed, the standard practice is to use air-cooled gasoline engines to drive each unit.

Central Cleaning Planned

Ground has been purchased and plans are under way to erect an electrically driven central tipple and cleaning plant on a railroad siding to be built three-eighths of a mile from the business district of Grove City. A central shop already has been built on this ground. It is featured by floor-slab radiant heating and was built largely by unskilled labor recruited from the student body at Grove City College. A small concrete-block building near the shop contains the metering equipment and feeder switches for circuits supplying power to the shop, as well as additional equipment to handle the future preparation plant.

The main part of the shop is 40x 70 ft. The eaves height is 18 ft. A low wing 12x70 ft. along one side serves as the supply room. On the outside of this wing is a 12x70-ft. concrete slab serving as a loading platform. To speed construction by reducing delays in securing materials and by keeping labor to a minimum, prefabricated 40-ft. curved trusses of laminated wood were purchased from the Rilco Wood Products Co., Wilkes-Barre, Pa. Walls are concrete blocks, with rounded corner blocks at doorways and outside corners to improve the general appearance.

Pilasters, or columns, were included in the wall construction to provide supports for the rails of a bridge crane which will be installed as soon as it is available. Holes for heating pipes, conduits and the like were provided, as far as possible, during construction, rather than by the more-laborious method of drilling afterwards.

Radiant Heating Efficient

Floor-slab radiant heating was selected primarily to make possible rapid melting of the ice off the trucks. It also provides additional comfort for the men working in and under trucks by radiating the heat to the areas where it is most needed. Incidentally, it will save considerable fuel, which naturally is coal. The pipes cast into the floor slab are wrought iron, and an opposite-connected manifold system is used, assuring equal circulation distances for the hot water and promoting uniform heating over the whole floor.

Mr. Bobo is an airplane pilot and can fly his smaller craft—a Beechcraft Bonanza. He employs a regular pilot for the other plane—a Beechcraft DS-18 executive transport. The smaller plane, a four-place job, is a single-engined machine with tricycle landing gear and loud-speaking radio. The larger plane, is a twin-engined machine and accommodates eight persons, including pilots. Power is supplied by two Pratt & Whitney 450-hp. engines. It is equipped for maximum comfort and with every navigating facility. De-icers are installed on the wings and the propellers are de-icing units with hydraulic feathering in case of engine failure. With but one engine operating, this plane will climb 500 fpm. fully loaded. Even so, Mr. Bobo expects to equip it with jets as soon as they become available for that particular type. This will provide an additional major safety feature when taking off from short runways and especially from valley airports in mountainous sections. The cabin is soundproofed and the instruments include the latest in dual radio sets and a radio compass with dial-needle indicator.

The modern offices of the company, in Grove City, are on the second floor of a new two-story building of modernistic design. The first floor houses the showroom and parts and service departments of a Chrysler-Plymouth sales agency, which also is an interest of Mr. Bobo, who owns the building. The offices are air-conditioned. Floor space includes a large recreation room and a three-room suite where two or three business guests can be put up for the night.

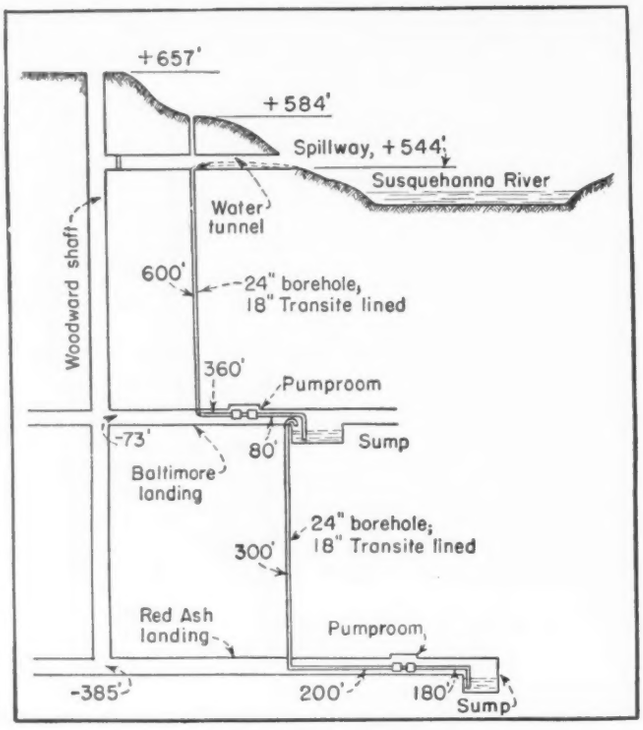


FIG. 1—NEW BOREHOLE ARRANGEMENT at Woodward colliery.

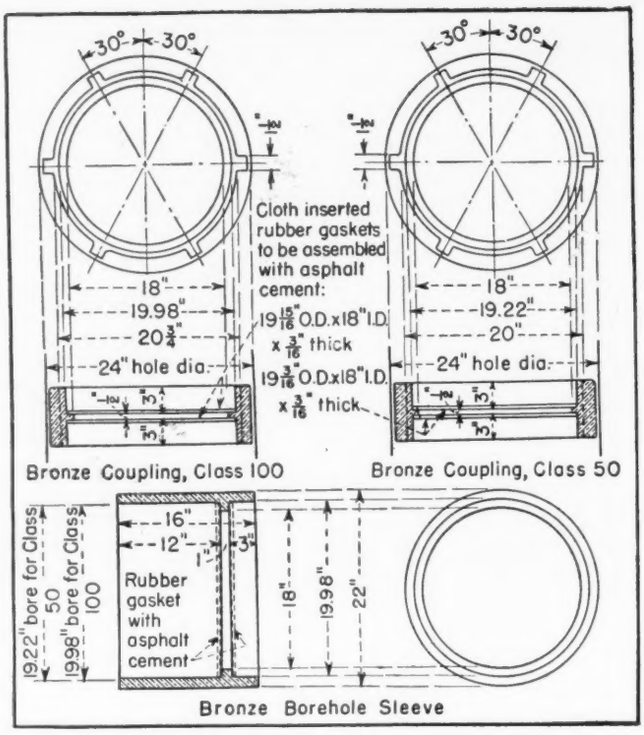


FIG. 2—PIPE-COUPLING and borehole-sleeve details.

Boreholes Replace Shaft Lines

Inside and Outside Boreholes Lined With Asbestos — Cement Pipe to Resist Acid Replace Shaft Columns — Pipe Lowered on Sheave and Bracket in Wire-Rope Loop —Installation Cuts Pump Operating Time

By BENJAMIN GLEASON
Assistant Mining Engineer, Glen Alden Coal Co., Wilkes-Barre, Pa.

TO HELP SOLVE an acid-water problem, large-diameter boreholes were adopted to replace column lines in the hoisting shaft at the Woodward colliery of the Glen Alden Coal Co., in the northern anthracite field near Wilkes-Barre, Pa. The holes were lined with asbestos-cement pipe installed by lowering it length by length by a combination wire-rope loop and sheave-and-bracket assembly let down in the holes. One borehole was made from the surface while the other is completely underground.

Mining at Woodward colliery is carried on simultaneously in ten different coal beds underlying the broad Wyoming Valley, through which the Susquehanna River flows over the sand and gravel accumulations of the so-called "Buried Valley." In spite of these conditions, the inflow of water into the mine workings is moderate, averaging 1,500,000 gal. in a 24-hr. period.

The drainage equipment at the mine consists of electrically driven centrifugal pumps with capacities of 1,500 g.p.m. each. Two of these pumps are located in the lowest, or Red Ash, bed and lift the water into a sump in the Bennett bed, from which two other 1,500-g.p.m. pumps relay the same water, augmented by drainage from the Bennett and upper coal beds, to the surface (Fig. 1).

The pumps formerly discharged the water through two 14-in. cast-iron column lines installed in the pipe compartment of the main hoisting shaft. The water is very acid (pH 3.4). Consequently, considerable difficulty was encountered over the years in maintaining the column lines. Following a serious break in both columns in 1946, it was decided to replace the shaft columns and pump through boreholes to be located in the shaft reservation pillar. As a result of several years of satisfactory experience with Transite pipe in resisting corrosion by acid mine waters, plans were made to drill a 24-in. borehole and to line it with Transite. As the same pump arrangement was to be continued, it became necessary to drill an inside borehole from the edge of the Bennett sump to the Red Ash bed and a hole from the surface through the drainage tunnel to the Bennett bed. The borehole from the surface was a churn-drill hole, while the inside hole from the Bennett to the Red Ash bed was drilled by the shot method. Sprague & Henwood, Inc., Scranton, Pa., was awarded the contract for the drilling of both holes.

The Transite pipe used for lining the two boreholes was Class 100 for the lower half of the surface hole and the entire length of the inside hole. Class 50 was used for the upper part of the surface borehole.

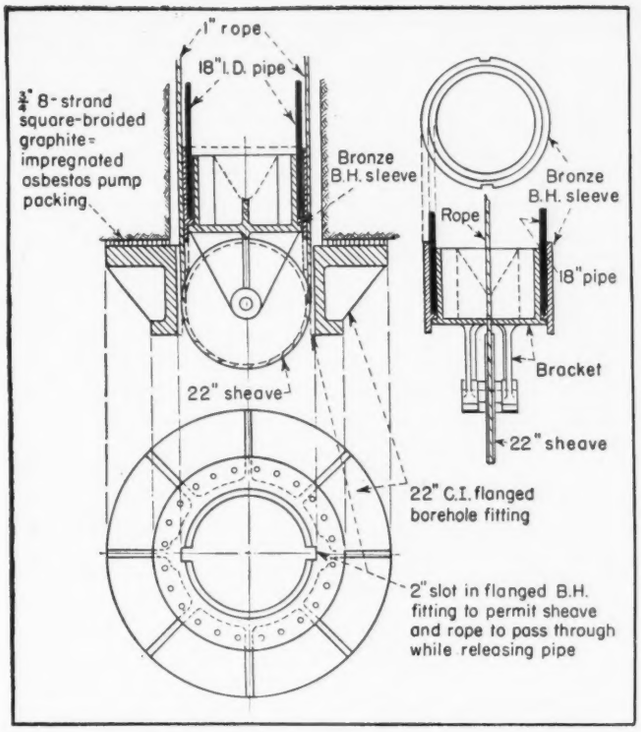

1" rope
18" I.D. pipe
¾" 8-strand square-braided graphite-impregnated asbestos pump packing
Bronze B.H. sleeve
Bronze B.H. sleeve
Rope
18" pipe
Bracket
22" sheave
22" sheave
22" C.I. flanged borehole fitting
2" slot in flanged B.H. fitting to permit sheave and rope to pass through while releasing pipe

FIG. 3—SHEAVE-AND-BRACKET ASSEMBLY for lowering pipe.

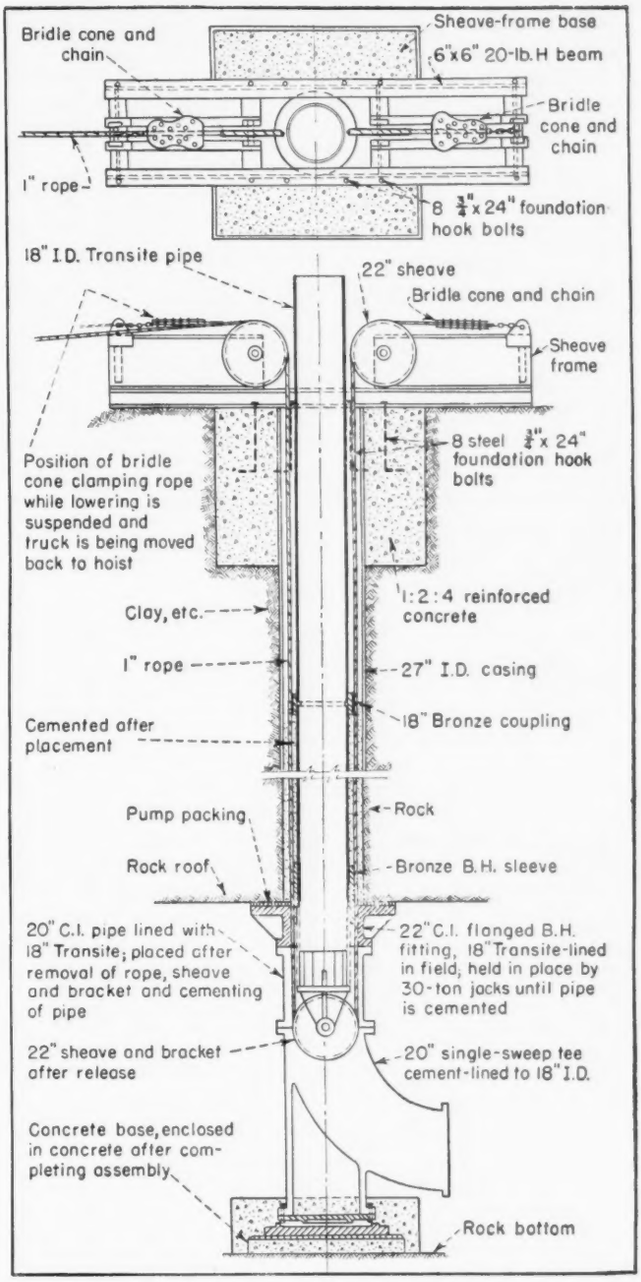

Bridle cone and chain
Sheave-frame base
6"x6" 20-lb. H beam
Bridle cone and chain
1" rope
8 ¾" x 24" foundation hook bolts
18" I.D. Transite pipe
22" sheave
Bridle cone and chain
Sheave frame
8 steel ¾" x 24" foundation hook bolts
Position of bridle cone clamping rope while lowering is suspended and truck is being moved back to hoist
Clay, etc.
1:2:4 reinforced concrete
1" rope
27" I.D. casing
Cemented after placement
18" Bronze coupling
Pump packing
Rock
Rock roof
Bronze B.H. sleeve
20" C.I. pipe lined with 18" Transite; placed after removal of rope, sheave and bracket and cementing of pipe
22" C.I. flanged B.H. fitting, 18" Transite-lined in field, held in place by 30-ton jacks until pipe is cemented
22" sheave and bracket after release
20" single-sweep tee cement-lined to 18" I.D.
Concrete base, enclosed in concrete after completing assembly
Rock bottom

FIG. 4—DETAILS of lowering frame and foot assembly.

Each section of Transite pipe was a standard 13-ft. length with a weight of 465 lb. for Class 50 and 765 lb. for Class 100.

The main problem to be solved was the placing of the Transite pipe in the borehole, since it is impossible to equip this type of pipe with screw couplings. We conceived the idea of lowering the pipe columns down the boreholes in loops of steel rope, placing one pipe length on top of the other as the columns were lowered section by section.

The connection between two Transite sections consisted of a bronze coupling (Fig. 2) 6½ in. long with a ½-in. inside collar and weighing 100 lb., which rests on one section and supports the one immediately above. A soft-rubber gasket 3/16 in. thick was inserted between each bronze collar and the butt ends of the Transite sections. All contact areas (bronze, rubber and Transite) were coated with a generous application of a bitumastic compound during assemblage.

Each bronze coupling had six fins on the outside to center the Transite pipe in the borehole and insure a uniform thickness of grout. The outside diameter of Class 50 Transite pipe is 19.18 in., and of Class 100, 19.94 in. The inside diameter is 18 in. for both.

The total weights of the assembled Transite columns, including bronze fittings, was 22,000 lb. in the borehole from the Bennett to Red Ash beds and 36,000 lb. in the borehole from the surface to the Bennett bed. Serious consideration had to be given to the safe handling and accurate placing of such heavy loads. A special lowering assembly was designed and constructed. This served the purpose well and permitted the job to be done speedily and without mishap.

The details of the lowering assembly are shown in Figs. 3, 4, and 5, which indicate the arrangement used on the borehole from the surface to the Bennett bed.

A special steel lowering frame (Fig. 4) was set over the borehole openings and securely anchored in a concrete base. Two 22-in. sheaves were fastened on the middle axis of this frame. The sheaves were placed so that the rope passing over them and down the borehole would pass between the inside walls of the borehole and the outside of the Transite pipe, bronze sleeve and couplings. A 1-in. plow-steel non-spinning rope was passed over these 22-in. sheaves. One end of the rope was securely held by a bridle cone-clamp, which in turn was fastened to a heavy eye bolt on the far end of the lowering frame.

A third 22-in. sheave was inserted in the loop of rope thus formed in the borehole (Fig. 3). This sheave supported, by means of a pin, a bracket on which, in turn, rested a bronze sleeve (Fig. 2) 16 in. long with a 1-in. inside collar. The Transite sections were seated on the collar as they were lowered. The free end of the rope, after passing over its sheave, passed through another cone and clamp similarly fastened to a heavy eye bolt secured to the near end of the lowering frame. The latter cone and clamp were arranged so that during interruption of the lowering process the rope could be securely fastened and held in place. The free end

of the rope then was taken down an incline to a shackle block secured in a retaining wall (Fig. 5), thereby changing the angle of application of the force.

In constructing the lowering equipment (Fig. 5), advantage was taken of an old but substantial retaining wall about 170 ft. away from the shackle block previously mentioned. Using steel straps, the following were attached to this wall: (a) a heavy timber platform, on which a 22-hp. single-drum electric hoist was securely mounted, and (b) a six-sheave shackle block. A narrow-gage track was built out from the front of the engine platform, extending almost to the angle shackle block previously mentioned. A truck operating on the track was fitted with the following: (a) a rope reel with a capacity of 1,500 ft. of 1-in. plow-steel non-spinning rope, and (b) a six-sheave shackle block. Both were securely fastened to the truck platform in preparation for subsequent operations.

The 1,500 ft. of the loose end of the 1-in. rope which had been passed through the angle shackle block previously mentioned was wound on the reel. A ⅝-in. rope 2,000 ft. long was reeved between the two six-sheave shackle blocks. One end was fastened to the block mounted on the truck, and the rope was then carried around the two six-sheave shackle blocks, with the remainder wound on the drum of the hoisting engine. A bridle cone to clamp the 1-in. rope was fastened to the forward end of the front six-sheave shackle block.

In preparation for starting the first pipe section, the truck with reel and shackle blocks was positioned close to the hoisting engine. The 1-in. lowering rope was clamped to the bridle cone fastened to the forward six-sheave shackle block on the truck, preventing any further unwinding of the rope from the truck reel. The special bronze sleeve previously mentioned was placed on the lowering bracket in the borehole, followed by a length of Transite pipe held in place on the special bronze fitting. The hoisting engine was then released. It required four men to push the truck toward the borehole until sufficient pipe had been lowered to take the load.

Steps in Lowering Operation

It will be noted at this point that when the pipe sank 13 ft. the truck moved forward 26 ft. and 312 ft. of rope was unreeled from the hoist drum. The bronze coupling with the ½-in. collar was placed on the No. 1 pipe section, and this step was repeated as each section was lowered until the truck had advanced close to the angle shackle block. The bridle cone at the front sheave on the steel lowering frame then was clamped to hold the 22-in. sheave and bracket stationary. Next, the bridle cone on the truck holding the 1-in. rope was released, permitting the hoisting engine to pull the truck and reel back to its original position near the hoist. As the truck was being returned, rope was unreeled equal to the distance traversed by truck. The rope was again clamped to the bridle cone connected to the six-sheave shackle block mounted on the truck. Then the bridle cone at the front sheave of the lowering frame was unclamped and the cycle was repeated until the 600 ft. of pipe had been lowered.

While lowering the pipe was going on, the roof was moiled off to a level bearing surface in the Bennett vein at the bottom of the borehole. A 22-in. cast-iron flanged borehole fitting designed to permit passage of the pipe-carrying bracket, but too small in diameter to pass the bronze sleeve fittings on the bottom of the pipe, was then cribbed up to a point 1 ft. from the level roof. When the pipe had been lowered sufficiently to rest on the flange (Fig. 3), the bracket sheave and rope were removed from the hole. Then, four 30-ton hydraulic jacks raised the total weight to the roof (where a tight seal was made with pump packing) and held it there. The four jacks carried the full weight of the pipe fittings and concrete grouting. The latter was a continuous-pour operation to completion.

A foot elbow fitting, resting on a concrete base built on the bottom of the Bennett vein, was put in place (Fig. 4), making possible the connecting of the borehole with the Bennett-vein pumps by means of Transite-lined cast-iron pipe.

The same method was used for lowering the pipe from the Bennett vein to the Red Ash vein.

A greater pumping efficiency is one result of the new set-up. Previously the pumps operated an average of 17 hours out of 24 to keep the sumps within capacity. Now they operate only nine hours to accomplish the same result, and pipe maintenance has been reduced to a negligible item.

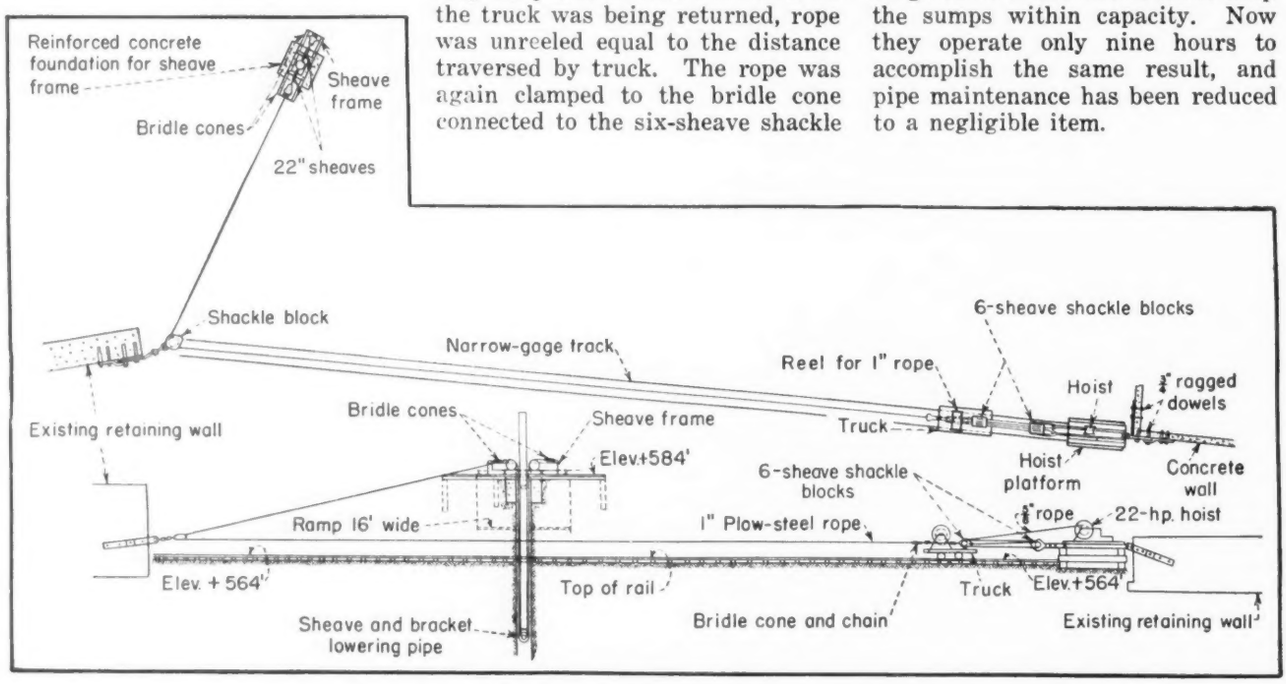
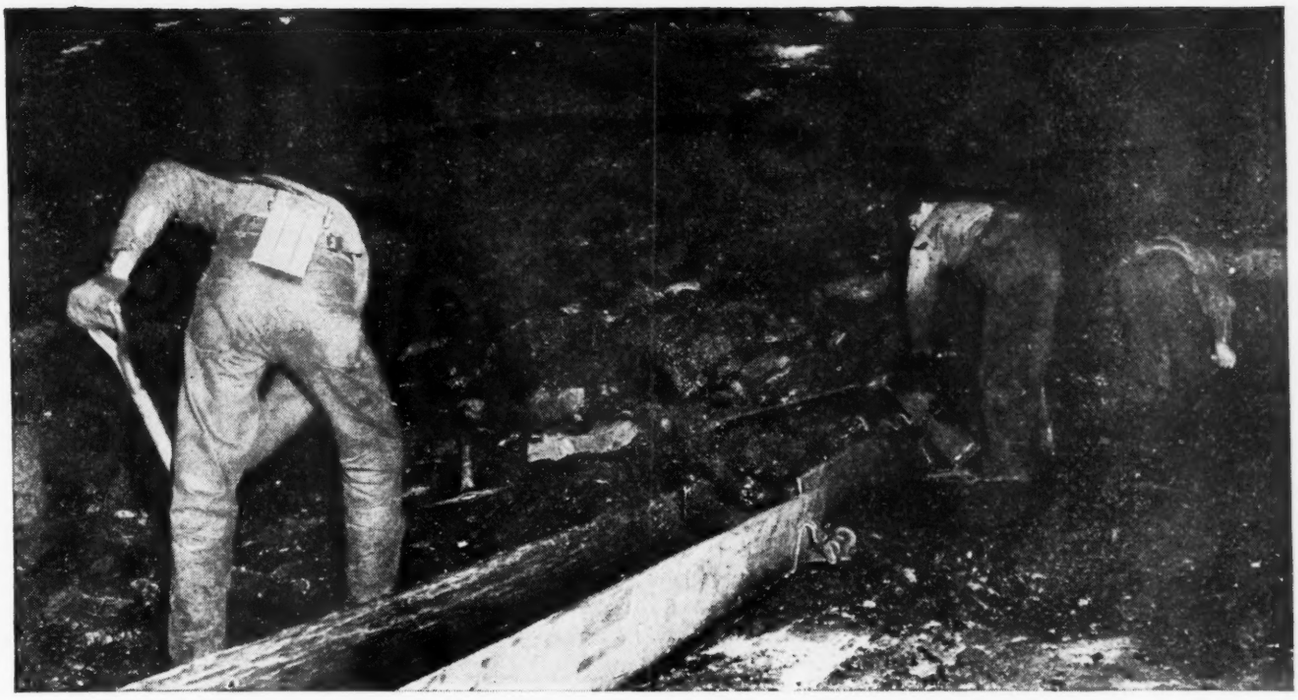


FIG. 5—HOIST-AND-TRUCK SET-UP for lowering pipe in borehole.

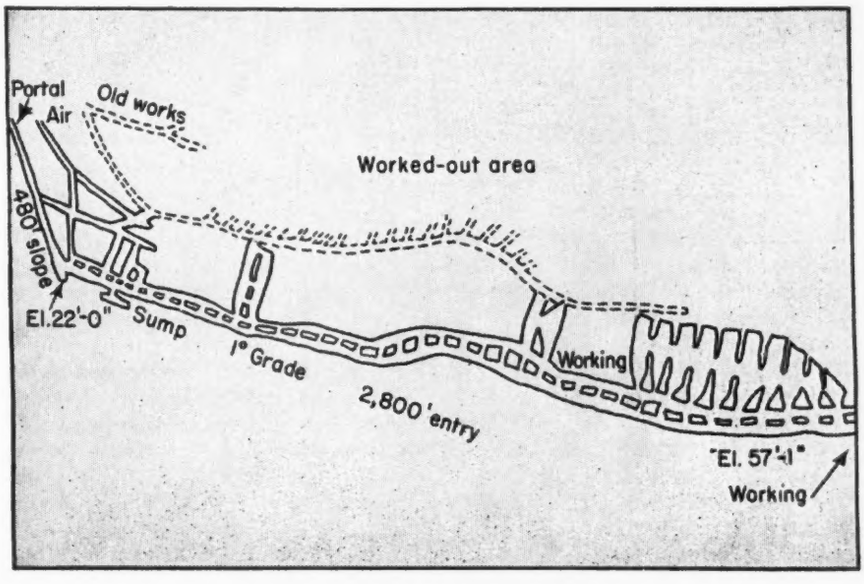


HAND-LOADING INTO SHAKER CONVEYORS is the mining practice at Southport.

Southport Ups Oregon Capacity

Coal Development Seen as Coming Oregon Industry — Coos Bay Field Home of State's Great Deposits—Southport Mine First to Mechanize — Washing and Crushing Equipment Round Out Production Facilities

By FRANCIS W. HILTON
San Diego, Calif.



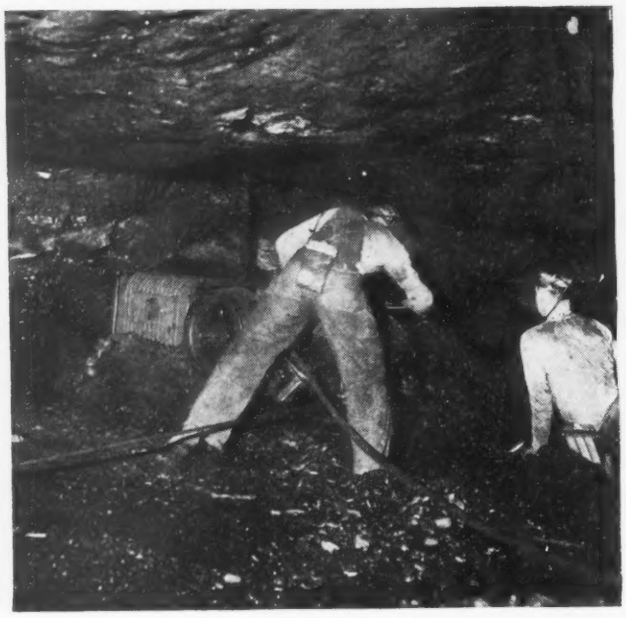
PRESENT DEVELOPMENT, Southport mine.

FEW THINK OF OREGON, today the largest lumber-exporting State in the nation, as an area with major coal-producing possibilities. Yet, for all its huge lumber output of over half a billion board feet annually, geologists agree that coal is the sleeping colossus of Oregon's natural resources which, with proper development, could result in a financial yield second only to timber. For example, the most recent report of the Oregon Department of Geology and Mineral Industries has the following to say about the coals of the Coos Bay area, where the Southport mine—the subject of this article—is located:

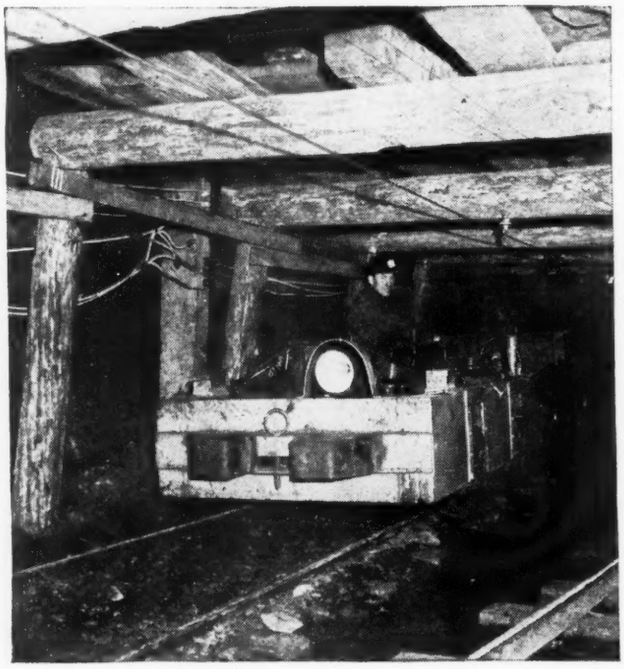
"Coos Bay coal should have an important position in Oregon's economic future. It is not unreasonable to presume that liquefaction and distillation processes (for which Coos Bay coal is well adapted) may some day add to the gasoline and fuel-oil supplies of the nation, as well as supply some of the many other coal derivatives which are rapidly increasing in use in the chemical and plastic industries.

"A substantial tonnage of coal will be needed for production of alumina from Oregon clays. If Oregon's vast reserves of clays are to be used in developing refractory in-

COAST FUEL MINING AND PREPARATION FACILITIES



CUTTING (LEFT) AND DRILLING at Southport.



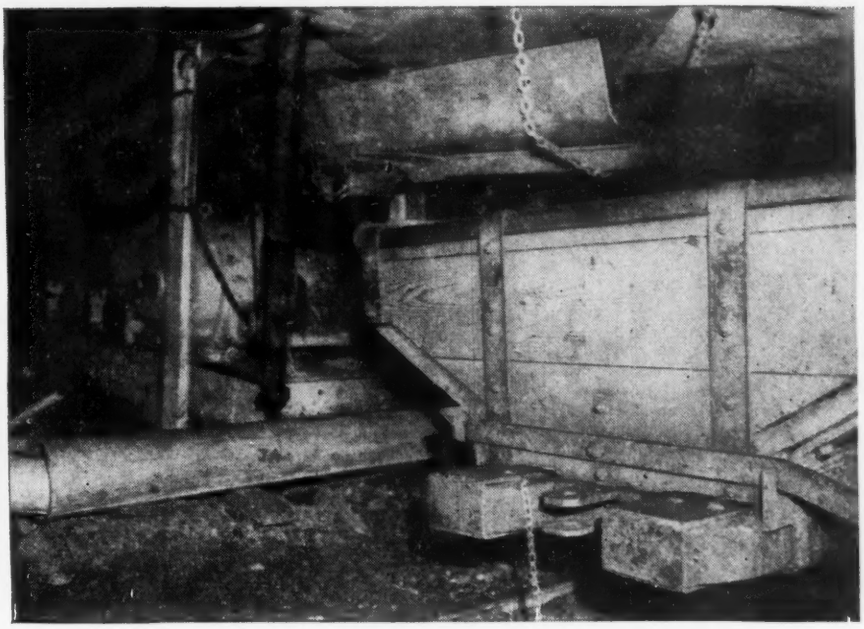
TRIPS (LEFT) ARE HANDLED by a homemade electric locomotive (right).

dustries, with application to all the various fields of ceramics—such as porcelains, pottery, pipe and brick —Coos Bay coal certainly should come into the picture."

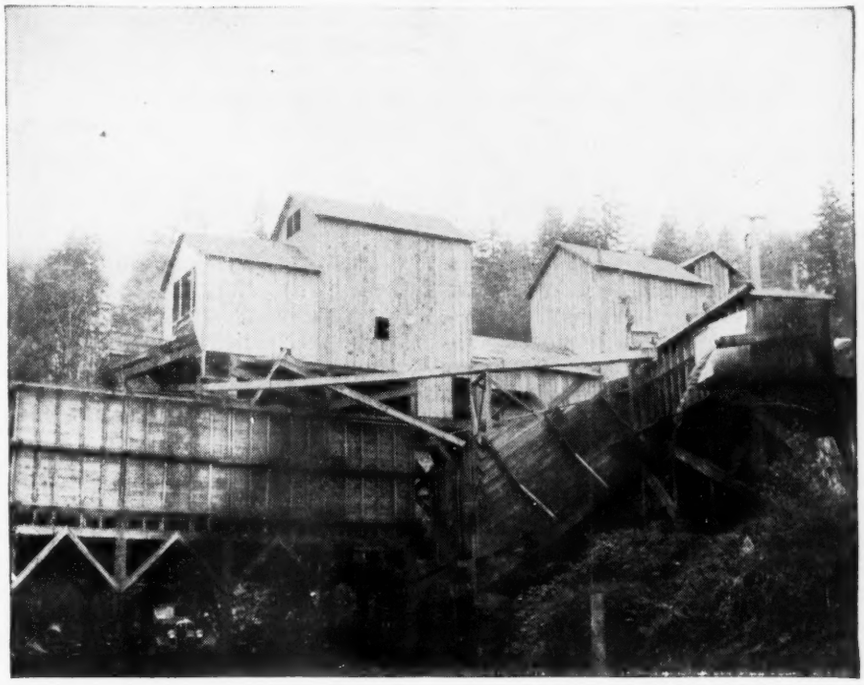
Coos Bay lies in Coos County, the home of Oregon's great coal deposits. The county is in the southwestern part of the State, approximately 90 miles north of the California line. Taking in 65 miles of the Oregon coast, the county has an excellent outlet to the sea through the city of Coos Bay—on the Bay of the same name—now the world's greatest lumber-export center. Most of the charted deposits of coal are adjacent to or within easy reach of the bay and its many deep-water sloughs.

The Coos Bay field, measuring 35 miles north and south and 11 miles east and west, is a roughly elliptical basin. The topographic relief is moderate and the surface is slashed by many streams that cut deep valleys through the hills. Much of the area has been logged off and is covered with heavy brush and second-growth timber.

Coal was first discovered in the Coos Bay field in 1853. Numerous mines have been opened in the years since. Only one, however—the Southport—has continued or is producing more than a few tons a day. Before the mechanization of Southport and the installation of the present washery, local consumption of coal from the Coos Bay field was negligible. One reason was the poor condition of the hand-mined ungraded product offered for sale, the uncertainty of delivery, particularly during the rainy season, and



PAN LINES are hung from posts by chains. Right—Conveyor discharging into mine car.



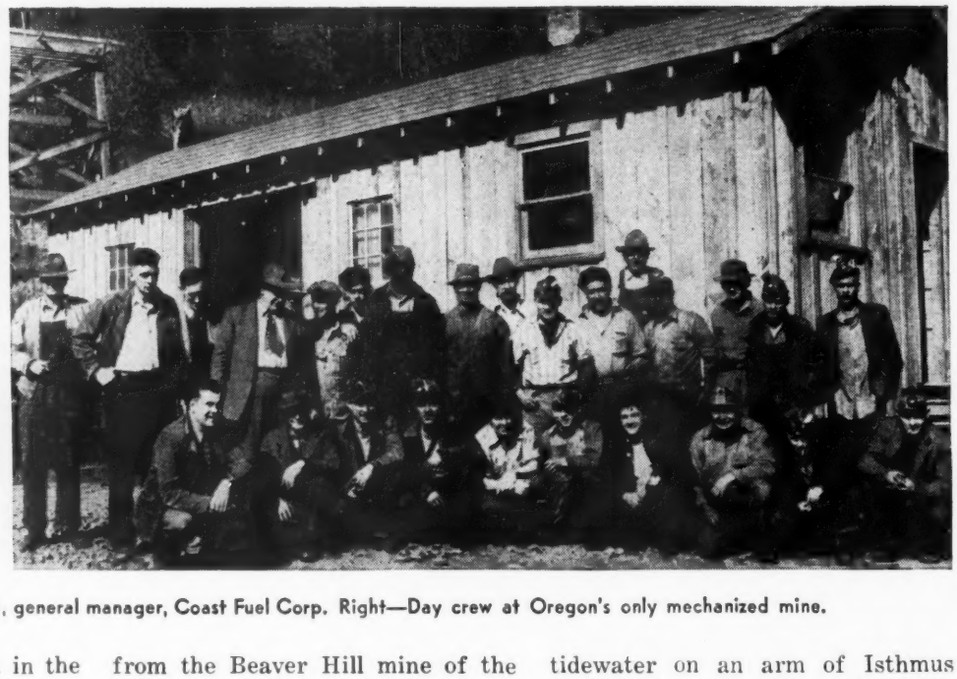
THE SOUTHPORT PREPARATION PLANT includes a washery and bunkers for truck loading.

the abundance and cheapness of wood fuels. However, with carefully washed and screened coals now available for the first time, and with wood fuels growing scarcer, the demand for coal has shown a steady increase. And as local sawmills turn more and more to the utilization of wood wastes formerly discarded or sold as fuel, the wood fuel problem will become more acute. Consequently, coal is being more and more adopted for both commercial purposes and domestic heating.

Coos Bay coals are of the Eocene Age and sub-bituminous in rank. None are coking. They are characterized by a relatively high moisture content, moderate ash, low sulphur and a heat content of 9,260 to 10,080 B.t.u. per pound "as received." They withstand breakage well in mining and handling. Most of them are classed as strongly slacking. Consequently, they will not stand storage during dry weather without oxidation and loss of moisture.

One of the biggest handicaps in the reactivation of the Coos Bay field was the general belief—based on the early unwashed dirt-laden product—that the coal was low in quality and unsuited for stoker or industrial uses. This erroneous impression became so widespread that the U. S. Bureau of Mines made exhaustive tests and reported that the coal is well adapted to stoker use when properly prepared. Oregon State geologists supported the Bureau's findings. They declared further that Coos Bay coal compares favorably with most of the Colorado and Wyoming sub-bituminous coal shipped into Oregon, and particularly into the big Portland industrial area, and that it is on a par with State of Washington output, with the exception of the Black Diamond product. The slacking problem, it is felt, can be overcome by new treating processes, and the Coos Bay coals are classed as good for producing such things as gas, tars, resin, creosote and briquetted char.

Thickness of the Coos Bay beds ranges from less than an inch to more than 19 ft. For a distance of some seven miles around the outcrop, the Beaver Hill vein runs fairly uniformly—rarely less than 4 ft. thick and usually more than 5 ft. The thickness generally is over 5 ft. in the Newport Basin and 3 to 4 ft. in the Riverton Basin. The altitude varies. Horizontal or slightly dipping veins are present in the Eastport and other mines close to Coos Bay. Dips of 8 to 15 deg. are encountered in the South-



Max W. Bennett (left), general manager, Coast Fuel Corp. Right—Day crew at Oregon's only mechanized mine.

port mine and 30 to 45 deg. in the Beaver Hill and Klondike mines.

Coal was discovered in the Coos Bay field on a donation claim in what is now the City of North Bend in 1853—the year of settlement by the first Coos Bay colony, made up of people who had come across the Coast Range from the early-day gold-mining community of Jacksonville. The first coal was shipped from Coos County in 1854, but the cargo, bound for San Francisco, was lost on the treacherous Coos Bay bar. The second shipment of 200 tons the same year brought $40 a ton in the California metropolis.

First Mines Opened in 1856

In 1856, the Newport and Eastport mines were opened and Coos County coal began moving down the coast to California. These were followed by several other ventures before 1874, when Southport—the operation destined to become the first—and thus far only—mechanized operation in Oregon. By 1880, when records were first kept, production in the Coos Bay area was about 40,000 tons annually. Maximum production was achieved in 1904, when 111,540 tons was shipped. After 1905, the California market started to decline. In the 1920's, when oil began replacing coal in railroad operation and domestic heating, coal mining was virtually abandoned in Coos County, production dropping off to around 10,000 tons a year, largely for local consumption. Between 1880 and 1920, recorded output of the field was 2,800,000 tons. From 1903 to 1920, at least half the output came from the Beaver Hill mine of the Southern Pacific company, closed in 1923.

The first detailed survey of the coal in the Coos Bay field was made in 1896 by J. S. Diller of the U. S. Geological Survey. While the exact tonnage of the Coos Bay reserves has never been determined accurately, it was estimated at a billion tons as far back as 1913. Seeking a more positive estimate, the Oregon Department of Geology and Mineral Industries made a one-year survey which revealed known deposits of around 100,000,000 tons. Still other deposits in nearby unchartered areas represent additional unknown quantities.

In the years following the opening of Southport mine in 1874, some five miles south of what is now the City of Coos Bay, it was extended some 3,000 ft. About 55 acres of coal have been mined. Total production is estimated at 250,000 tons. Most of the output—fairly large for a number of years—went to San Francisco via coastwise vessels.

In June, 1944, the Coast Fuel Corp., composed mostly of Portland men, leased the Southport mine, which is owned by the Southport Land & Commercial Co., San Francisco, and the first mechanization of an Oregon coal mine was undertaken. Deepening of a new slope begun a year previously was started. In addition to ship traffic, the area is served by a branch of the Southern Pacific R.R. and U. S. Highway 101, both about a half mile from the mine. Ocean vessels also can load at a dock on Isthmus slough, less than a half mile away.

The Southport portal is near the foot of a hillside some 75 ft. above tidewater on an arm of Isthmus slough. The coal vein is 56 in. thick. It dips about 7 deg., with local variations. A parting in the middle is 6 to 10 in. thick. Roof and floor are sandstone. Characteristics of the coal now being mined are: B.t.u., 9,990 "as received"; ash, 8.6 percent; moisture, 12.2 percent "as received"; ash fusion, 2,150 deg.

Slope Sunk in Vein

The present operation is down the dip from the abandoned former workings. A 490-ft.-long slope on a 5-deg. inclination was sunk in the vein and a double entry was turned off 95 ft. from the bottom. There is approximately 300 ft. of coal between the upper gangway and the lower limits of the old workings above. Double headings have been driven 2,800 ft. Production now is from rooms while the entries are being driven through a fault and around the end of the old workings. When this operation is completed, a block of some 60,000 tons of coal additional will be opened.

The lower entry is 16 ft. wide and the upper 20 ft. Top production from the two headings is 200 tons per day. The coal is being mined on the retreat by the room-and-pillar method, with 300-ft. rooms 40 ft. wide and 20-ft. pillars.

During the peak of the season 45 men are employed. The mine operates two shifts a day, five days a week. Shifts are eight hours, portal to portal. The underground crew now consists of four men per face and one haulage man, one timberman and two trackmen on the day shift. The swing shift is handled by four men per face, one

haulage man and one timberman. The wage scale is $13.05 a day for trucker's helpers, coal pickers, hoistmen, truckers and muckers, and $14.05 for machinemen and bunker foremen. Max W. Bennett, former chief loftsman for the Kaiser-Swan Island shipyards, is general manager of the Coast Fuel operation.

Two Goodman cutters, with 6½- and 8-ft. bars undercut the coal. Both are powered by 50-hp. 440-volt a.c. motors. Headings are drilled with 1¼-in. holes 6 in. short of the undercut. Shots are fired with instant electric caps using a hand magneto. Rotary air drills and J.B. 45 jackhammers are used for drilling.

Shaker Conveyors Employed

Coal is transported to cars by shaker conveyors, using two miners at the face. Swing pans are used at the face and are pulled into the fall by 6-ton portable hoists. Consequently, two miners can keep the pan lines full with a minimum of shoveling. Chains instead of the original cradle supports have eliminated 90 percent of the pan-line trouble originally encountered. Both shakers discharge into one car by use of a chain conveyor installed in the crosscut.

The wooden-end dump cars, with a capacity of 2½ tons each, were made in Coos Bay. Five cars constitute a trip and can be loaded in five minutes when both conveyors are working. A locomotive is used behind the loads, braking the trip out and pulling the empties in. The cars are spotted by hand after delivery by the 2-ton locomotive. This electric mine locomotive, first in the Coos Bay area, was made on the job because a locomotive was urgently needed. But in the war period of 1944-45, when materials and machinery were at a premium, delivery could not be obtained except after a number of months. Consequently, Coast Fuel decided to have one built locally.

The locomotive was produced through the combined efforts of the Hansen-Whitney Electric Co. and the Neish Machine Shop, of Coos Bay. It is powered by a 15-hp. d.c. motor with a V-belt drive. The unit has 19-in. wheels and a speed of 600 f.p.m. A 25-hp. motor-generator unit supplies current to an overhead trolley unit. For operation of face equipment, 2,300-volt a.c. is carried underground to a substation, where it is stepped down to 440 volts for distribution. The locomotive hauls cars between the face and the siding at the foot of the slope, where they are attached to the hoist rope.

The hoist on the surface has a 30-in. drum and is chain driven by a 50-hp. electric motor. A ¾-in. wire rope serves as a hoisting cable. Hoisting a trip of five cars requires 1½ min. On the surface they are automatically spragged and then pushed separately by hand to the surge bin.

The entries are run on a 1-percent grade for drainage. Thus far, however, little difficulty has been encountered from water. Drainage is accomplished by collecting the small flow of mine water in a 100-ft. sump at the foot of the slope and pumping it to a gravity drain halfway up.

Ventilation is provided by a 36-in. Austin exhaust fan supplemented by two 12-in. Austin booster fans near the faces. The air is conveyed along the entries by 12-in. metal pipe. As the work progresses the present ventilation equipment will become inadequate and an 8-ft. propeller-type fan has been ordered. A recent test for gas at the face by the U. S. Bureau of Mines revealed virtually none present. The mine crew uses M.S.A. cap lamps.

Timber Available Nearby

A minimum of timbering is required in the entries. Both split and round Douglas fir posts are easily available on the wooded slopes of surrounding Southport land. These are set on 6-ft. centers.

The roof is uniformly strong and even and causes little trouble. The floor has a tendency to roll slightly. Light jackhammers are used to level it for the track, which is built with 30-lb. rail. However, 40-lb. rail will be used in future operations of the mine.

The washery has a capacity of more than 40 tons of raw coal per hour. Coal from the surge bin passes over a 30-in. Link-Belt reciprocating pan feeder with a 2⅜-in. punched-plate deck. The undersize goes to a bin feeding a 12-in. Link-Belt bucket conveyor, which elevates the coal to a 60-in. Link-Belt jig with a 4-in. stroke and a 3/16-in. screen. The oversize from the pan feeder passes over a 36-in. Link-Belt picking table. Lump coal is transferred to a 50-ton storage bin or is broken into smaller sizes by a Jeffrey 24x36 single roll crusher and delivered to a small bin which feeds into the boot of the bucket elevator handling the undersize from the pan feeder.

All the jigged coal passes over a double-deck Link-Belt vibrating screen, which delivers three products—nut, stoker and buckwheat—to the 50-ton bins. A 15-in. dewatering drag is installed to permit recirculation of the jig water to the washery tank. Water for the washery was obtained by damming a small canyon and installing a 2-in. high-pressure centrifugal pump. By using a 6-in. main line, the pump delivers 300 g.p.m. at a 40-lb. pressure to the jig.

The washery crew comprises three on the day and night shifts: hoistman, picking-table operator and washeryman. A blacksmith, electrician, trucker and trucker's helper complete the crew.

Coal Trucked to Railroad

Rock and waste also are delivered to a bunker and are trucked away for road ballast. A 6-ton Reo dump truck is used to haul the coal to the Southern Pacific siding 0.6 mile from the mine. All local deliveries are made either through dealers operating their own trucks and picking up the coal at the washery bunkers, or by contract haulers who transport the coal as far as 95 miles. The bulk of production is now being shipped to government facilities in the State of Oregon.

The buildings on the surface, in addition to the 56-ft. tipple, consist of an office-warehouse, a dry room and change house equipped with showers, a blacksmith and welding shop, compressor house and fully inclosed washery. Compressed air is furnished by a 284-c.f.m. Worthington air-cooled compressor powered by a 50-hp. electric motor. Welding repairs to both surface plant and underground are made with a 200-amp. 440-volt three-phase Lincoln arc welder mounted on a mine-car chassis.

Driving to the property line, turning rooms and robbing pillars on the retreat are among future plans for Oregon's only mechanized coal mine. When the present entries have been completed, the slope will be deepened another 300 ft. and a new set will be started. As quickly as conditions warrant, Mine No. 2 will be undertaken. This will open a separate block of coal lying up the dip from the present operation and above the abandoned workings of the original mine. Coal from this new operation will be delivered to the washery by a surface tram or similar conveyance.

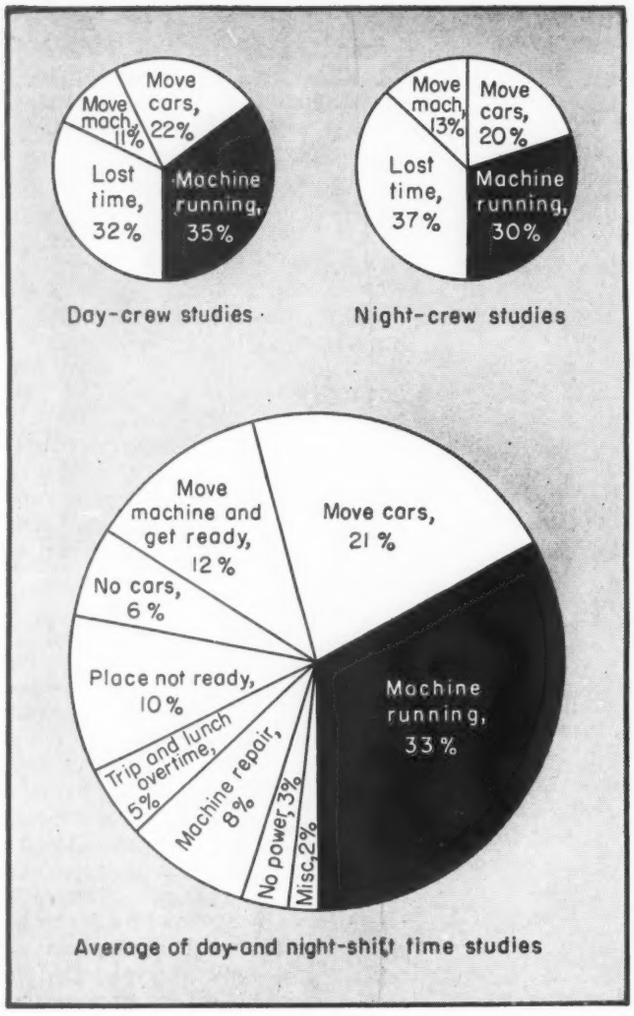


FIG. 1—SUMMARY OF LOADING-MACHINE time utilization before application of modern management principles.

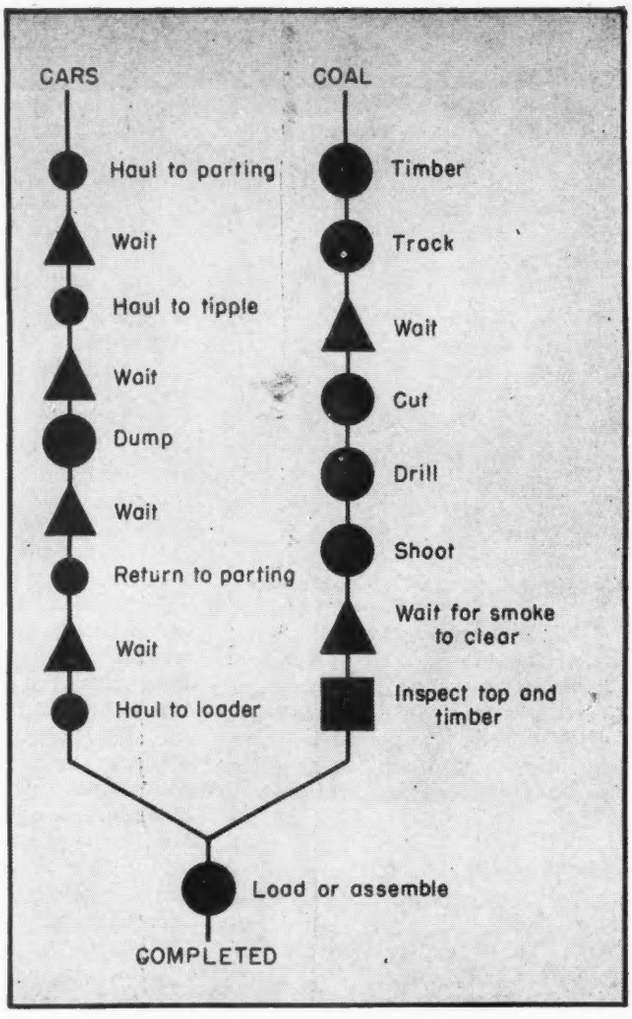


FIG. 2—PROCESS CHART showing flow of coal and cars to the final assembly, or loading, point.

Production Management

Raising Machine Output Through Modern Management Principles, Including Time Studies, Ups Efficiency and Cuts Cost by Eliminating Non-Productive Time and Promoting Use of Better Methods

By VICTOR C. STEPHENS
Supervising Engineer, Singleton-Hartwell, Inc., New York

APPLICATION OF accepted principles of management to industrial operations has reached a high degree of perfection in the past 30 years. So far, the evidence indicates that the same cannot yet be said of coal mining, although the fact that progress is being made is shown by certain recent production records. But the waiting for cars, lack of planning and other failures to take full advantage of managerial principles, referred to in various studies and reports over the years, including the 1925 report of the U. S. Bituminous Coal Commission, still plague the coal industry and prevent attainment of rightful productive efficiencies.

What the opportunities are and how management can take advantage of them are the subjects of this article and another to follow in an early issue of *Coal Age*. Examples used are derived from study of mechanical-mining operations in the course of the author's management-engineering work. It should be kept in mind that these examples are intended to illustrate the application of basic principles to the problems and conditions encountered and are not presented as a system that can be applied directly to any coal mine. The method of application must be adapted to suit the conditions encountered in each mine and to the personalities and the abilities of the persons who are responsible for operation.

For example, time-studying the operation of the various loading machines and the work of the crews

might show that the machines were actually loading coal only 33 percent of the time at a mine. The remainder of the working time (67 percent) might be taken up by the nonproductive activities—or lack of activities—shown in Table I and Fig. 1. While the record at many mines is some or substantially better, there is good evidence that numerous others experience losses equal to or greater than these.

Production management in other industries is based on the principle that the first step is to determine all the details of a problem and then study each detail in search of possibilities for improvement. In other words, a large problem, in effect, is broken down into a number of smaller and easier ones. Each possible improvement is studied for its effect on the whole and acceptable improvements are coordinated with the other parts of the problem. Then, the changed procedure is adopted, making sure that all the personnel affected understand the change and the reasons for revising a method that had been good enough up to the time of the change.

In seeking a production increase in a well-managed factory, new equipment would not be bought or men added to the payroll until all operations had been analyzed to see what results could be obtained. In general, the analysis would follow a procedure similar to the following:

1. The maximum capacity of each operation and each machine would be determined through time-study.

2. Time-study results would be analyzed to determine the causes of delays preventing the attainment of maximum output.

3. Method studies would be made of the "limiting operations," or those requiring the most time to produce a piece, thus limiting the over-all factory output. The goal would be finding better ways of performing these limiting operations, which increases the rate parts are supplied for following operations, or makes it possible to step up the rate at which preceding operations are performed.

4. Incentives would be adopted —if they were not already in use— to stimulate employee interest in eliminating delays for which they are responsible.

Only when the maximum production economically possible to obtain from existing equipment and manpower was achieved would additional men be hired or additional

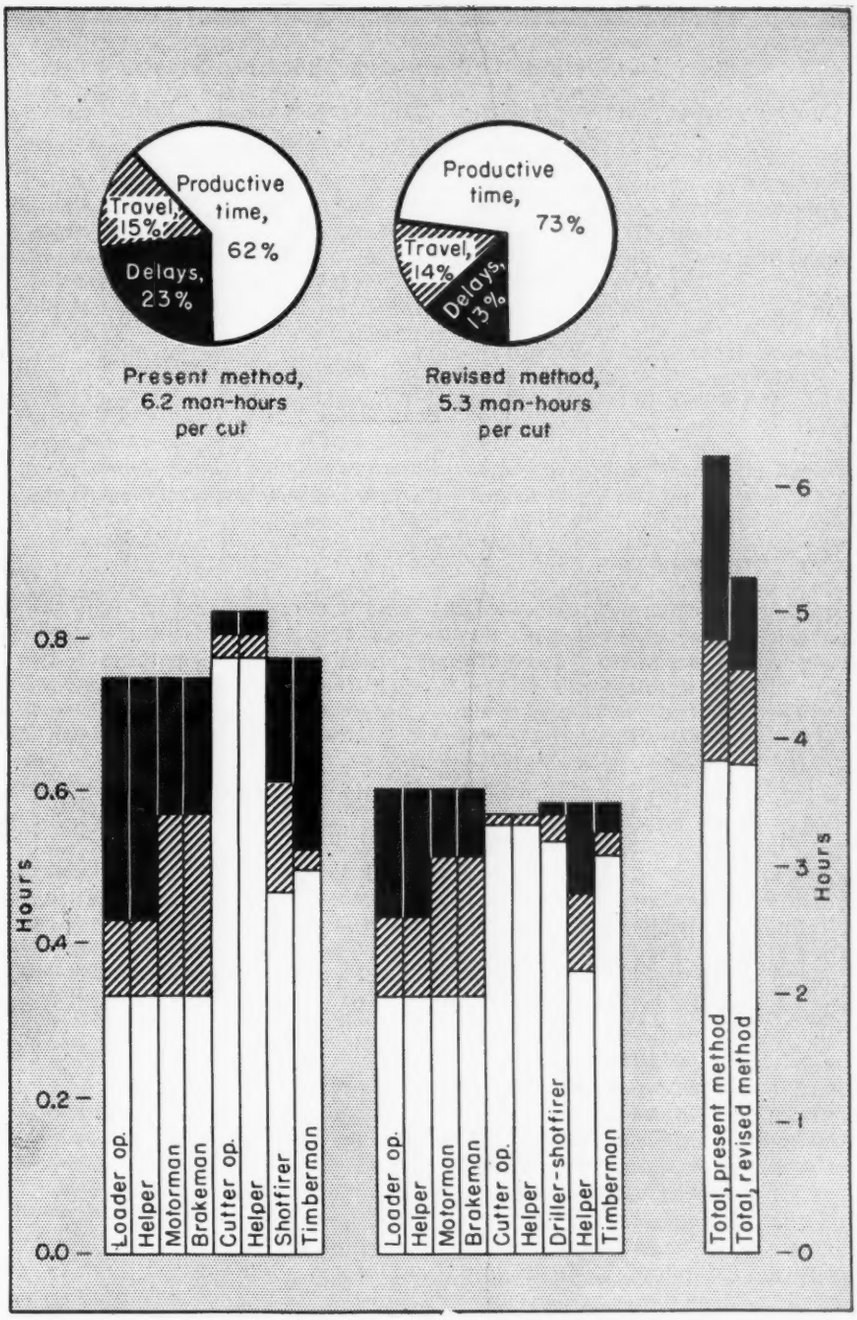


FIG. 3—RESULTS WITH old and new loading set-ups. Adding drill helper to eight-man crew increases productivity 0.7 tons per man per hour.

Table I—Analysis of Non-Productive Time of Loading Machine

Operation	Percent of Shift	Chargeable to:
Move cars	21	Method used
Move machine, get ready	12	Method used
Place not ready (no coal)	10	Poor crew coordination
Machine repair	8	Mine management
No cars	6	Mine management
Delayed man trips and long lunch periods	5	Individuals involved
No or bad power	3	Mine management
Miscellaneous	2	Individuals involved
Total	67	

Table II—Cutting, Drilling and Shooting Schedule

Cutter Operator	Cutter Helper	Drill Operator	Drill Helper
Tram machine to next place	Go with machine	Go with machine	Go with machine
Unload machine	Unload machine	Drill holes, right to left	Drill holes, right to left
Sump at right	Scrap up, check top and timber		
Cut across face	Shovel bugdust	Return to last place cut	Return to last place cut
		Load and tamp holes	Bugdust cut
		Shoot holes	Get powder and return to machine
Reload machine	Reload machine	Return to machine	Make dummies
Tram machine to next place	Go with machine	Go with machine	Go with machine

equipment purchased. Increases in payroll or investment in equipment then would be based on accurate and detailed knowledge.

The time-study is the most useful of the essential tools of modern production management. It not only provides the information necessary to set production standards but, if properly made with sufficient detail, it also provides the basic data for improving methods, eliminating delays and developing time standards from which production in contemplated new workings can be forecast and future requirements for manpower and equipment can be determined.

In most factories two or more parts are first manufactured and then are brought together to make an assembly. Of course, one of the parts may be so bulky or so heavy that it may be more economical to bring the other parts to it to complete the assembly. In a coal mine, in effect, two items are assembled to make the finished product, which is coal delivered to the parting. They are coal itself, which is the bulky element, and the mine car or other transportation unit. In bringing the car to the coal several operations are necessary. Several operations also must be performed on the coal before it can be placed in the car. Assuming that enough coal can be cut and shot down, and enough cars can be supplied, loading—or the assembly operation—is the limiting factor.

We have, therefore, a production cycle to which, as with any manufacturing process, the same principles of production management can be applied.

In the coal-mining example we have assumed, time-studies of the lays exist which are directly chargeable to management; i.e., "No cars" and "No coal." It might be assumed that the 16 percent of time lost for these reasons would have been much greater if losses for other reasons had not totaled 51 percent, thus providing an opportunity for the cutters, drillers, shotfirers and motor crews to catch up to the loading crews. To revert back to our factory comparison, the problem becomes one of getting a sufficient supply of the two components—coal and cars—to the same place at the same time for assembly (loading), plus improving loading methods to boost, in turn, unit output, over-all mine capacity and efficiency.

First, therefore, we must use the loading machine more efficiently to obtain as nearly its rated output as possible. Second, we must schedule coal preparation so that the tonnage available is at least equal to the tonnage the loading machine is capable of handling. Third, we must schedule car delivery so that enough are available to take all the coal the loading machine can produce.

We now have three relatively simple problems rather than one rather complex one. The next step is to break each of these down into still smaller and simpler ones, find the answer to each and translate these answers into methods that will result in the desired production increase.

LOADING

While two men—operator and helper—are assigned to the loading machine, its production depends on close coordination of their efforts with two additional men: the motorman and brakeman on the changing locomotive. Referring back to the time-studies, the following reasons for non-productive time were directly related to loader operation and had little to do with the supply of coal or cars.

	Percent of Shift Time
Move cars	21
Move machine and get ready	12
Machine repair	8
No power	3

Of these, "Machine repair" and "No power" are more or less chargeable to management and require separate investigation.

Since operating methods vary from mine to mine, depending on conditions and the preferences of local management, there is little advantage in going into details as to the methods used in achieving improvements. In brief, however, the solutions of the four relatively simple problems involved in the major loading problem could work out as follows:

Changing Cars—Depending upon the width of the face cut, and upon whether a crosscut was included, 8 to 12 cars are required to load out a fall. Originally, the motor crew brought in trips of only five cars, making it necessary for the loader to stop while a second and third trip were obtained. Excellent track permits increasing trip size to 8 to 12 cars, depending upon the width of the cut. Thus, six or more non-productive minutes are eliminated per fall and 10 percent more time is made available for loading.

Moving Machine — Changing from tramming the loader through cutoffs to tramming through crosscuts saves two minutes per fall. Thus, machine-moving time is reduced to equal the time required by the motor crew to bring in an empty trip, thereby contributing to the 10-percent saving previously mentioned in connection with car changing.

Machine Repair—Adoption of a preventive-maintenance procedure and deferring of minor repairs, such as clearing grease lines and the like, to the third or idle shift, result in a saving of 3 percent of the shift time.

No Power—While out of the field of the investigation, passing on to the management the fact that delays from this source can cost many thousands of dollars (perhaps $25,000 in our example) focuses attention on the fact that a considerable effort and a reason-

able expenditure of money by management to find a cure are warranted. When management knows the extent of losses, the natural reaction is to correct them if they are sizable.

As a result of the preceding steps, it becomes apparent that the loader now has a chance to produce coal 46 percent of the shift instead of 33, provided the extra coal and cars can be supplied; 62 percent of the shift if delays for "No coal" and "No cars" are eliminated; and 69 percent of the shift if delays chargeable to the mine workers also are eliminated.

FACE PREPARATION

With Problem No. 1—the loading operation—solved, the next step is solving Problem No. 2; namely, providing enough coal to utilize the maximum loader capacity. Fig. 1 shows that despite the other delays that gave the rest of the crew an opportunity to catch up with the loader, an average of 10 percent of the shift time is lost because coal is not ready to load, classified in the time-studies as "Place not ready."

Here, we get into the principles of production control applying when material is too bulky or too heavy to move from one place where an operation is performed on it to another. When the material stays in one place, it is necessary to schedule the activities of the men who work on it so they arrive at the right place at the right time. This type of control sometimes is called "Crew coordination."

To achieve crew coordination it is necessary to know how long each part of each operation takes, as well as the time for the men to move on to the next place. Analysis of the time for each part of the operation will permit developing combinations of such parts, taking into account travel and get-ready time, that will distribute the work equally among all men who must work on the material. Delays resulting when one operation requires more time than another consequently may be avoided.

In our example, time spent waiting for the cutting crew and shotfirer to prepare places for the loader was 10 percent of the time at the face. Analysis of this time showed that 5 percent of the total was the result of idleness or failure of the cutters and shotfirer to do their jobs promptly and with dispatch. The remaining 5-percent loss was a result of making a second cut in a place when a crosscut was needed.

The cutting-machine crew also drilled the holes. Study showed that if they were relieved of this job the time would balance out, provided the cutting machine always worked at least two faces ahead of the loader. When the work time required of other crew members was checked, it was concluded that the shotfirer could do the drilling if provided with a helper. It, therefore, was decided that the shotfirer be reclassified as a drill operator and be supplied a helper, the two working as a team with the cutting crew on cutting, drilling and shooting.

In practice, the drilling would be done considerably in advance of the cut, after which the drill operator and helper would return to the last place cut, load the holes and shoot. While the operator was firing the shots, the helper would get powder and detonators for the next place and prepare dummies.

The schedule to be followed by the cutting-machine operator and helper and drill operator and helper is shown in Table II. Its goal is the most economical employment of the extra crew member. As a result, a saving of 5 percent in total time at the face is achieved.

With Problems 1 and 2 solved, the following face delays remain:

No power, 3 percent; improvement, a job for management.

Machine repair, 5 percent; better maintenance should reduce substantially.

Car changing, 11 percent; no coal, 5 percent; trip and lunch overtime, 5 percent; miscellaneous, 2 percent. In industry, incentives normally would be considered to reduce these losses.

If cars otherwise were available, these delays, totaling 31 percent of the shift time, would represent an actual loss of production.

The part played by methods study and crew coordination in eliminating the remainder of the delays—18 percent of the time at the face—is shown in Fig. 3. Therefore, if cars could be supplied to capitalize on the gains already made, the loader would be in position to load coal 69 percent of the time instead of 33. Achieving this extra car supply is Problem No. 3.

DISPATCHING

Dispatching, if properly done, is the function that keeps the production stream flowing at the maximum. No part of the mining operation, inside or outside, can function at maximum efficiency if the flow of empty and loaded cars is interrupted or not properly expedited.

The dispatcher should be responsible for the following:

1. Keeping all producing sections supplied with sufficient cars at such intervals as to prevent production delays.

2. Keeping main-line traffic moving at a maximum safe speed and preventing collisions and interference that might result if authority to use a given section of track were not concentrated in one person's hands.

3. Keeping loaded cars moving to the tipple for dumping and getting cars away from the tipple before the sidetrack capacity is exceeded and the plant is forced to shut down.

4. Supervising the activities of all swing and tram motor crews.

If, in addition to these four functions, an incentive plan is installed, a fifth must be added. In other words, the dispatcher is the logical person to keep track of all time lost at the face as a result of causes beyond the control of the section foreman and his crew, such as "No power," "No cars" and "Machine repair."

Before production can be planned, coordinated and intelligently controlled, either in a mine or factory, certain information must be available at all times, to wit:

1. Machine capacity, or how many production units (cars) the machine work center (section) is capable of producing (loading) in a given period of time.

2. Machine load, or how many cars are available for the sections to work with. In other words, how long will it be before the sections run out of material—in this case, cars?

3. Machine utilization, or what portion of the normal day the machine actually is producing, what portion it is not, and why.

4. Inventory control, or how much material (cars) is on hand and where the cars are located at all times. When emergencies arise, this record enables the available cars to be distributed most effectively to keep production going.

5. Production records, or the actual output of each work center (section). The machine-capacity records must be adjusted from time to time as the skill or ability of the loading crew changes.

6. Moving orders. So that the work may be distributed equally and accurate control records kept,

Table III—Analysis of Dispatching

Required	Reason	Present Practice	Proposed New Practice
1. Visual record of loading capacity of each section in cars per hour	To permit supplying cars to sections in numbers and at intervals related to use	No record	Entry on peg board by blue signal peg; corresponds to production record on cards; adjusted monthly from production-record card
2. Visual record of empties left in sections	To permit relating remaining empties to rate of use so that new supply can be furnished before section runs out	No record	Difference in number of peg holes between tape indicating total empties in section for the day and total loads from the section for the day related to blue signal pegs indicating consumption in hours
3. Record of delays in sections by causes	To permit dispatcher to adjust production record to output per productive hour; to enable mine foreman to investigate delays and take corrective action; to control daywork time; and to prevent sending cars to a section when loading has stopped	No record	Phoning of information by section foreman to dispatcher and entry on summary card; signal peg indicates section not loading during down time
4. Record of all cars in the mine showing location and whether empty or loaded	To account for all cars and provide a ready means of determining where empty cars are available for distribution and loaded cars are ready for removal	Partial record only; sheets for cars at tipple and cars to swings; memory depended upon for location and number of cars on sidetracks, shop cars, and cars blocked, wrecked or otherwise out of service	Kept on parts of board, allocated by location of sidetracks
5. Running total of empties furnished to sections and loads removed	Providing visual up-to-the-minute operating information for the dispatcher and management and to check total empties supplied against production hours	No record	Use of peg board showing total empties by tape and total loads by peg
6. Control of traffic movement	To prevent collisions and speed up trip movement to obtain maximum capacity	By memory	Use of traffic board showing track layout with signal lights showing position of moving trips and signal blocks through which they have cleared. Board also will show portions of track blocked for any reason

it is necessary that distribution of cars be concentrated in a central authority rather than left to those who actually handle the cars. The dispatcher should fix the number of cars to be distributed to each section rather than turning trips over to the swing-motor crews and leaving it to them.

With these principles in mind, it is possible to analyze the control actually employed. Table III summarizes the findings and the corrective procedures which could be employed at the mine used as an illustration. The new system of control, incorporating accepted principles of production management, makes use of a method of recording changes in production status that shows graphically the location of all cars in the mine at any time, as well as the output of any loading section.

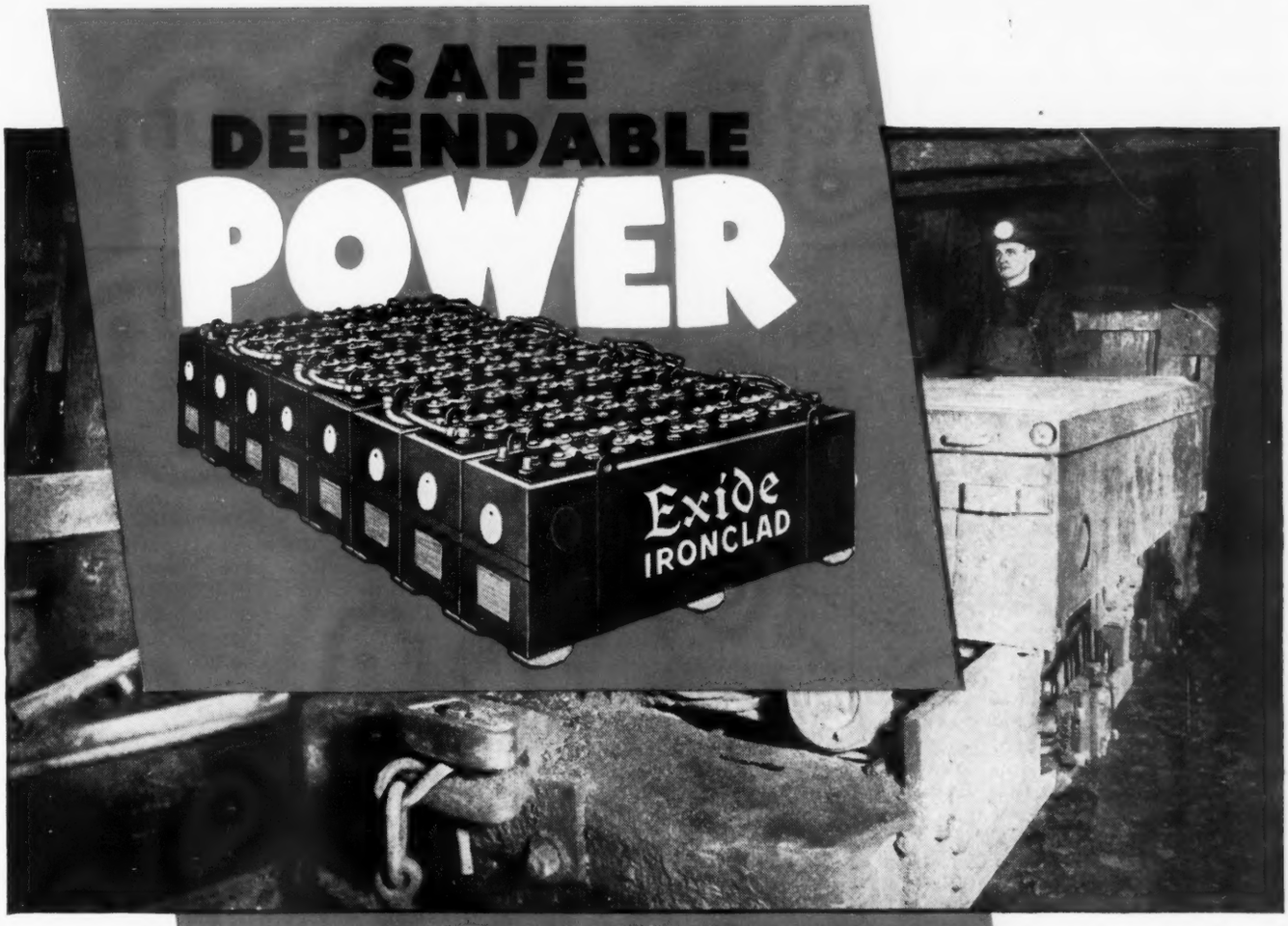
Based on actual experience, such a control system should eliminate lack of cars in any loading section at any time. It also should reduce somewhat the running time between the face and the tipple because, with a visual record of trip movement, it is possible to clear trips through a greater number of signal blocks, thus reducing the number of stops to phone the dispatcher. Furthermore, every one of the cars in the mine can be accounted for at any time and all times whereas, otherwise, even an inventory is likely to come out short.

As a result of installation of the improved control system, the time loss because of "No cars" is reduced to approximately 3 percent—a saving of 3 percent of the time at the face in our assumed operation. This saving is felt throughout the mine, as well as at the tipple, and increases productive machine time from 33 to 66 percent, or double.

To summarize: this article has attempted to show how by studying the reasons for idle machine time it is possible to more than double production without increasing the number of machines or indiscriminately adding men to the payroll. This increased production gain was made possible by increasing the machine crew only one man, or 10 percent.

Without incentives, application of the principles of modern production management made possible increasing productive time at the face from 33 to 66 percent in the mine in question. One result is a saving of some 50 percent in face labor cost, amounting in this example to 29.5c. per ton. In addition, this saving was achieved without requiring the miners to put forth any extra effort or speed up. The saving was the result of eliminating nonproductive time and making the work easier by using sound principles of modern production management underground.

(How time-studies are made and how the results are analyzed and used to develop time standards will be described in a second article by Mr. Stephens to appear in a following issue.)



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The Foremen's Forum

How to Make Workers More Cost-Conscious

Pressure on the foreman to cut his costs is getting tougher all the time. The pressure starts with the customer, who wants his coal at a reasonable price and who, by buying coal from one company or another, decides in the end which company prospers and which one closes down. Customer pressure, in turn, puts a three-way squeeze on top management to satisfy the customer, pay the stockholders for the use of their money, which acquired the coal land and bought the machines for the mine, and pay the miners a fair wage for their work.

So, to keep customers happy and miners at work, top management has to keep costs down in the face of a high wage scale and a shortened work day, an increase in the cost of cutting and loading machines, locomotives and mine cars, and higher prices for such supplies as brattice cloth, bits, timber, ties, etc.

Since the foreman is in the mine where the work is being done, the job of keeping costs low narrows right down to him. He is responsible for th- day's output and the productivity of his workers; the use, care and maintenance of heavy equipment and the allocation and use of various supply items.

These supply items add up to a big chunk of money, but many of them are so small and seem so trifling that it takes careful watching to prevent throwing away lots of money in small dribbles. For example, it's easy to throw away a bit before its usefulness is gone. It's easy to use too much grease when a little less would do just as well. Worn chains sometimes can be sent back to the shop and made as good as new. A good deal of timber can be salvaged by a little more care in handling it. These, of course, are only a few examples of savings that can be made. The list could go on.

To make these and other savings, however, the foreman needs the help of his workers. Just as top management makes him cost-conscious, he must make his men cost-conscious and gain their cooperation in keeping costs low. To put his ideas across to his men, the foremen can act along several lines. Six of them, some good and some bad, are listed below:

1. Nagging at his men—This is a good way for the foreman to create ill will and turn his men against him, with resulting breakdown of morale, "soldiering" on the job and low output.

2. Rationing supplies—Dealing out supplies piecemeal only as they are needed for the day's work may turn out to be false economy because the day's production then is geared to the supplies that have been measured out. In addition, this method of cutting costs takes no account of emergency needs and disregards the fact that every day is a new day and may possibly set a new output record, with consequent need for more supplies.

3. Keeping a finger on every step of the operation every minute of the day—This leaves the foreman no time for moving around through the mine, keeping his records, talking to individuals or thinking through some of his other problems. He can't be everywhere at once, for sure, and while things may go well where he is, production may bog down somewhere else. In addition, if he tries to direct every step of the operation every minute, his workers soon will lose their initiative and, after completing one step, will stop and wait to be told what to do next.

4. Showing workers how to use supplies—Now we're beginning to get somewhere. Real efficiency doesn't mean the foreman must be miserly with supplies. It does mean that he must use the right quantity to do the job at lowest over-all cost. A foreman is expected to know how much the right quantity is—whether it is explosives, grease, powder, timber or pipe—and what happens when too much or too little is used. If he shows his men that a little more, or a little less, would have done a better job and then tells them why, he gives them a chance to become better workers. And when you come right down to it, most men want to become better workers and will welcome a chance like this.

5. Showing them how they, along with their company, have a stake in cost savings—Lecturing and blowing off steam about rail bonds, ties, nuts and bolts won't get a foreman very far with his men, but by talking with them individually and in small groups, informally and good-naturedly, and by giving them a chance to ask questions, he can show how the company must make enough profit to support the wage scale, how supply costs en-

What Is the Cost Of Mine Supplies?

In each of our stores, Whitesville No. 2 and Highcoal No. 1, we are erecting a bulletin board with a few mine supplies attached thereto. If you can guess within $1 of the actual cost of the supplies on the board, you will rceive $10 in cash.

In case of ties, each will be awarded $10 in cash. The supplies will be renewed each pay period. If no person guesses within $1 of the price of the supplies on the board, the prize money will accumulate. If no person guesses the right amount the first time the board is displayed, then for the next payroll period the prize will be increased from $10 to $20.

Those eligible to guess in this contest are all male employees of Anchor Coal Co. except the officials.

Mr. Goldinger, our purchasing agent in Cleveland, will mail the current prices to us each time. The letter containing the prices will not be opened until the day the contest is decided.

Employees at our Highcoal operations cannot guess on the board in the Whitesville store. Likewise, Whitesville employees will not be eligible to guess on the board at the Highcoal store.

Turn your guess in to the payroll clerk or one of the store clerks. This contest is very simple. The supplies will be those which we use daily in and around the mines. Therefore, each employee has a chance of winning the $10 in cash.

Watch for the first board in the store and place your guess. Each employee will be entitled to one guess on each board.

Take a guess—you may be lucky.

GUESSING CONTEST on supply costs was launched among workers with this announcement by the Anchor Coal Co.

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ter into the picture and how each man, by making the best use of his supplies, can help himself by helping his company.

6. Getting the help of top management—As an example of stunts that may be staged to make workers cost-conscious, just as new ways are found to make them safety-conscious, a new plan at the Anchor Coal Co., Highcoal and Whitesville, W. Va., shows one way in which company officials can help the foreman develop cost-consciousness among his men. The plan is a guessing contest about various items commonly used in and around the mine, with a prize for the men in each pay period who can guess within $1 of the cost of certain items displayed on the bulletin board. The first announcement of the contest as it was published in *Anchor News*, the company newspaper, is shown elsewhere in this department.

A contest like this does five things: (1) provides an incentive for workers to inquire about costs, (2) puts all the workers on an equal competitive basis, (3) sustains interest from one pay period to the next, with interest and incentive growing as the jackpot grows, (4) keeps workers thinking about costs and (5) paves the way for the foreman to show how the worker gains by keeping costs low.

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Safe Drilling

By ROY SCHELL, Safety Manager
Lorain Coal & Dock Co.
Columbus, Ohio

Our records show we have been having a large number of drill accidents. In checking the cause of these accidents, we found that in the great majority of cases they were due to—carelessness.

The accidents which have occurred can be classified, as most accidents can, as to the manner in which they occurred and what caused them. Let us examine the causes of the most frequent drill accidents, which are often the most serious as well.

Clothes—One of the most frequent causes of drill accidents is clothing. Yes, clothes can cause an accident and a survey of our records shows that clothes have caused a great many of them. Too many times we do not pay attention to the clothes we wear and we let them become ragged and torn, or a missing button allows the clothing to flap loosely.

Torn, loose or ragged clothing, when worn around moving machinery, becomes very dangerous. In the drilling operation, the thread bar on the drill moves very fast and if a piece of clothing is caught by it, you know what can happen. If the man is lucky, he gets his clothes torn off. If he is not so lucky, he may find himself in the hospital.

When working around a drill, it is especially important to keep your sleeves fastened down snug around your wrists, or you can roll them up above your elbows. If you wear gloves, wear the wristlet type, without gauntlets. Our book of safety regulations states clearly that the clothes of men working around drills shall be fastened securely.

Walking Away—There is a second large class of accidents which are caused by the drill operator's walking away from his drill to do some other work while the drill is running. This is very dangerous, because if the drill auger happens to hit a piece of copper stone, the thread bar can very easily be shaken loose from the auger, allowing the drill to swing in any direction. If anyone is standing close to the drill when this happens, it can very easily result in serious injury.

Remember, as long as the drill is running, keep hold of it. Don't leave it unless you first turn off the switch and are sure the power is off.

Grabbing the Thread Bar—Another class of accidents is caused by grabbing or holding the thread bar while power is on. When starting a new hole, men will often hold the thread bar or auger in their hands until the bit gets started into the coal. Don't do this. It can result in a very painful injury to your hands. Also, if your clothes aren't properly fastened, they can easily be caught in the thread bar.

There are also men who will grab hold of the thread bar to pull it away from the coal before the drill has stopped or while the power is still on. This is dangerous for the same reasons named above.

For some details about the safe way to drill, remember to keep your hands in the proper places on the drill while it is operating; that is, keep them away from every moving part. Keep the left hand correctly back on the clutch lever to control the drill easily. Keep the hand away from the clutch boxing, where there is danger of catching loose clothing. Do not wear loose or ragged clothing. Fasten your clothing securely and keep it in good condition. Also, wait until the drill has stopped before pulling the thread bar away from the auger when you are taking the auger out of the coal hole at the face.

This is the safe way to perform this operation.

—*The Lorain-Lorado Journal*

A Super Writes a Safety Letter

Whatever general knowledge of mine safety you may have as a foreman is of little value unless you are able to pass that knowledge to the men working in your section or the department of work under your supervision.

You should take every opportunity to speak to your men about safety. You do not have to wait until an accident takes place to point a lesson to your men. By taking time and observing work habits closely, you can call attention to dozens of ways in which men have been injured and killed.

Watch out for the man who is not a safe, cautious, thoughtful worker—the man who takes unnecessary chances in a matter-of-fact way. Safe working has never become a habit with him and he is an accident in the making,—the one just around the corner. Such a man thinks it is the other fellow who is going to be injured or killed, not himself. He has never been sold on safety.

You cannot keep silent on safety and prevent accidents. You must talk and demonstrate it. To make men safety-minded, you must sell the idea and if we ever hope to remove the cause of more than 90 percent of our accidents, more will have to be done along this line.

We get to know the men who follow dangerous practices and wrong work habits and who take unnecessary chances, and unless we stop them before an accident beats us to them, are we going to be able to explain away our share of the blame? We cannot shed our responsibility when it comes to the safety of the men under us.

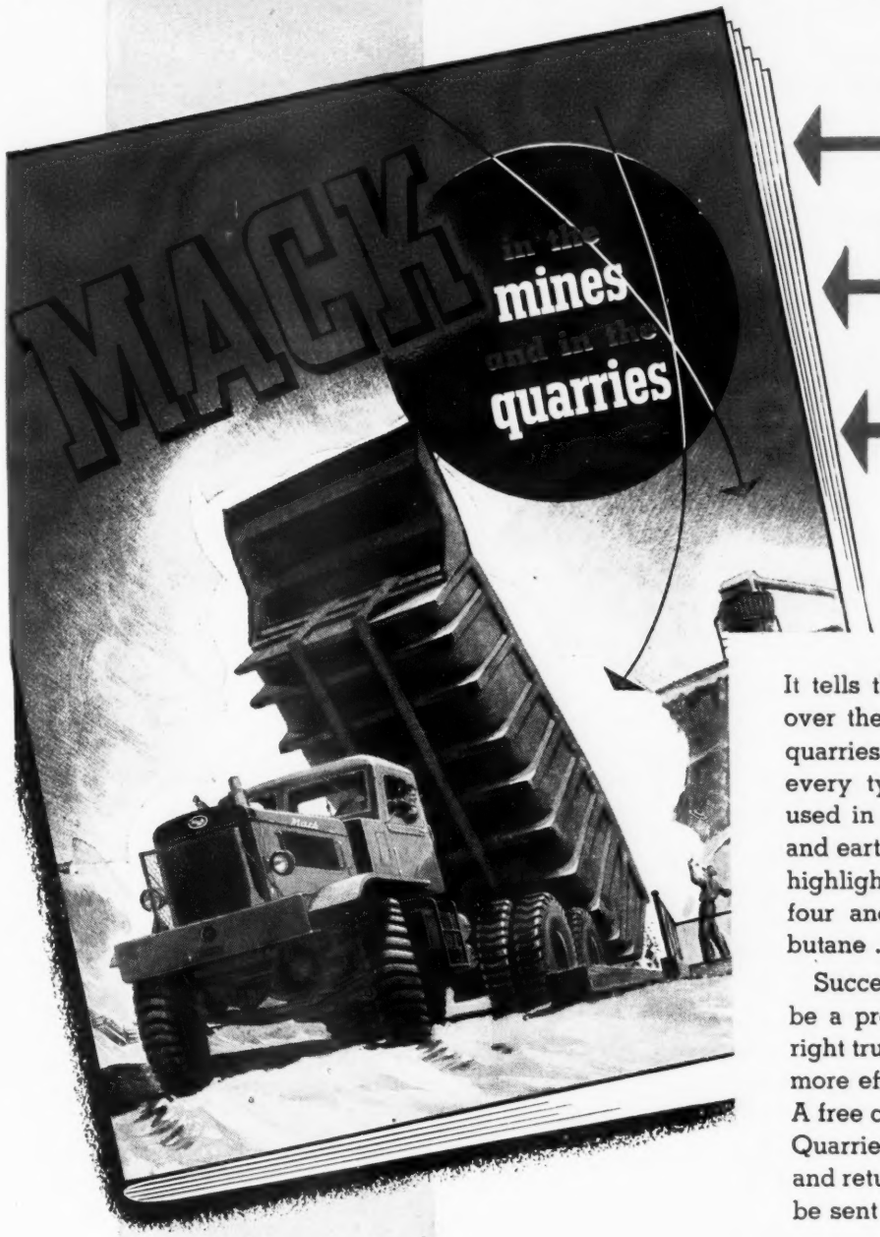
It is our job to teach—to sell safety to the men we supervise. Try it each day. Practice will make you better and you will be surprised at the results which will come in time. Should you fail to express yourself on safety, the frequency of accidents under your supervision may prove your undoing.

Get your men to size up every piece of work they do from a safety as well as an accomplishment angle. Preventing injury or death from stepping in before a job is finished can be done by proper thinking, which prompts the work to be done in a safe manner.

Thought is the foundation of safety and a safe-minded foreman, by courageously and freely expressing himself, can promote safe thinking among men he so frequently contacts. Be a teacher and a safety salesman first, then, if you must, an enforcement officer.

—This letter was written by P. A. Grady, general superintendent, Carrs Fork Coal Co., Allock, Ky., to his foremen.

This Booklet will Help You...



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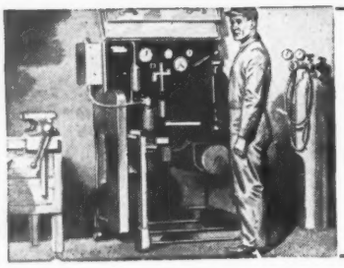


Operating Ideas

Keeping Rock Drills Fit

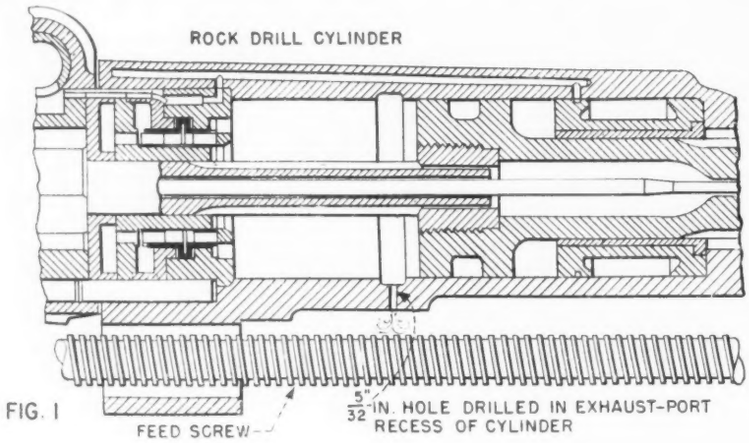


FIG. 1

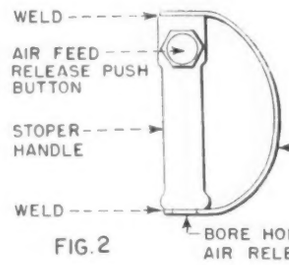


FIG. 2

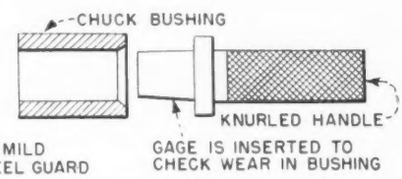


FIG. 3

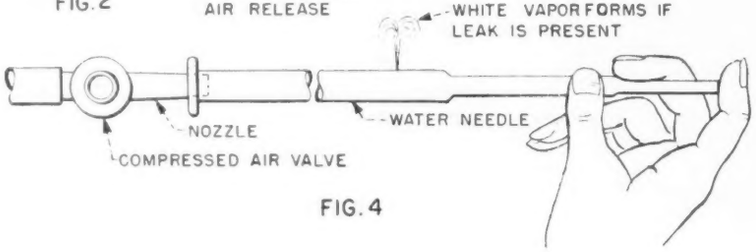


FIG. 4

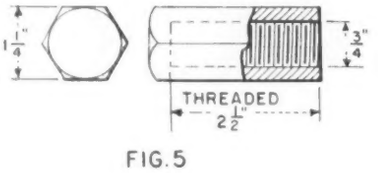


FIG. 5

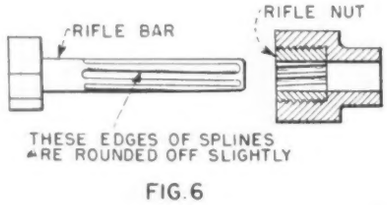


FIG. 6

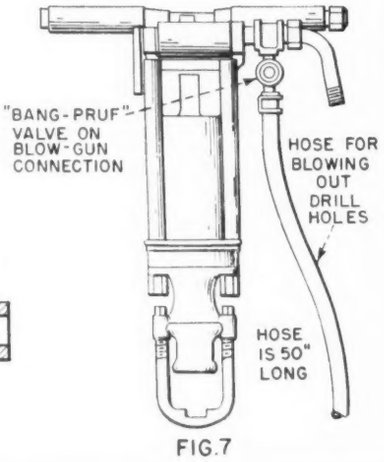


FIG. 7

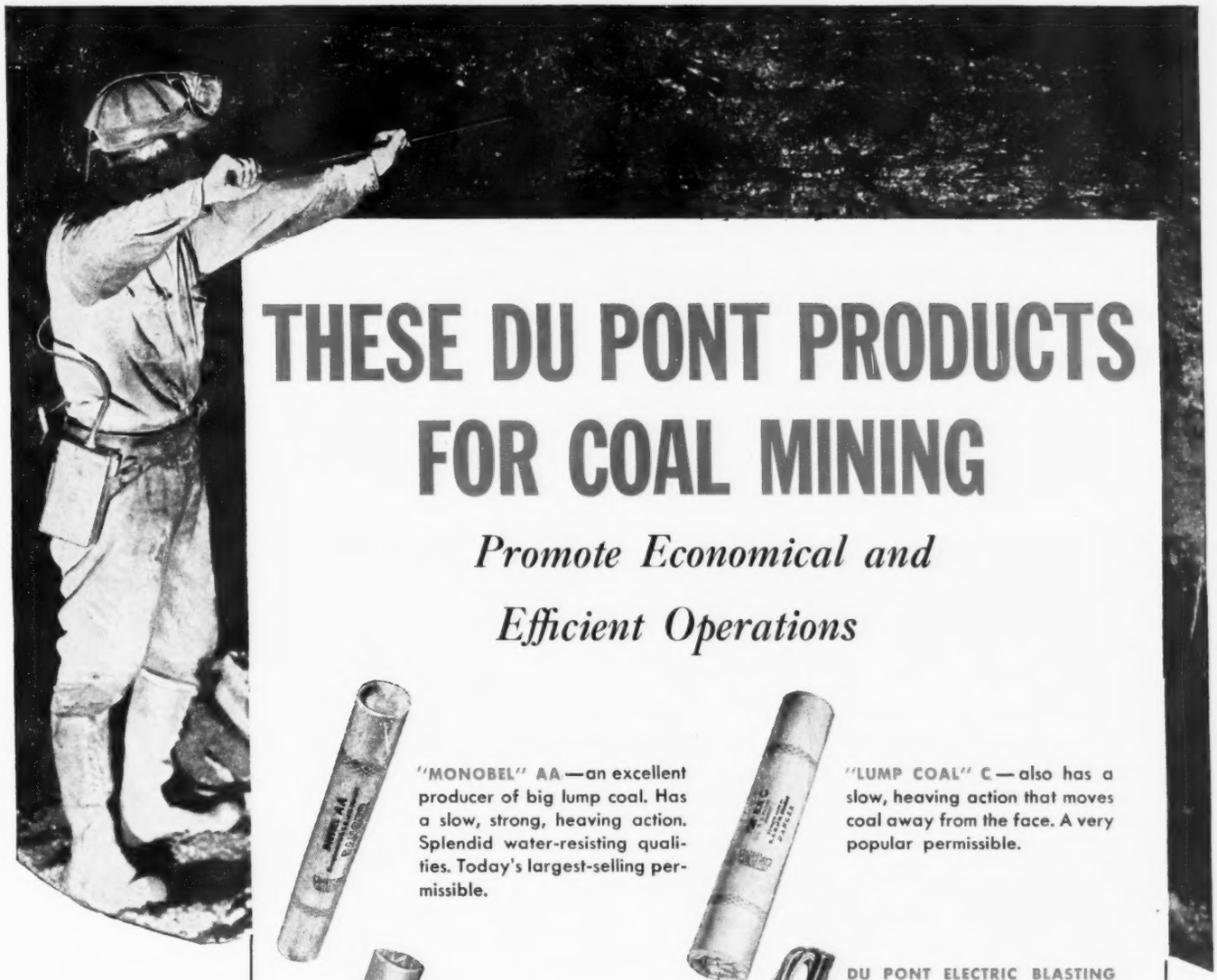
HERE IS A GROUP of operating ideas pertaining to rock drills and their maintenance that experimental engineers and mechanics at the Homestake Mining Co., Lead, S. D., have found to be useful. Some of them have been used for a number of years, and others are now incorporated in rock drills on the market, according to *Engineering and Mining Journal.*

Air Hole in Exhaust Port of Drifter to Clean Feed Screw. Rock dust which adheres to the exposed lubricated surface of feed screws on drifters causes rapid wear of these parts. This leads to poor alignment of the drill during drifting, and causes broken steels. Homestake mechanics solved this problem by drilling a small hole in the exhaust port of the drifter which directs a continuous jet of air against the feed screw as the drill advances during drilling. See Fig. 1. The oil present in the exhaust air lubricates the feed screw as well.

Guard on Stoper Handle Protects Operator's Hands. When steel in a self-rotating stoper gets stuck, the operator's hand on the stoper handle may be thrust against a rock wall. The guard shown here is welded on the handles of stopers to prevent these injuries. See Fig. 2.

"Go-No-Go" Gage to Test Chuck Bushings. Rock drill chuck bushings must be discarded after they are worn beyond certain permissible limits. The gage shown in Fig. 3 was designed to enable mechanics to check bushings for excessive wear. It is machined to close tolerances. If inserted into a bushing, it quickly reveals whether wear is excessive or not.

Quick Test for Leaky Water Needles. A pin-hole leak in a water needle can do plenty of damage to the inside of a rock drill, chiefly because it directs a steady jet of water against one part of the drill, and washes away lubrication from that point. These tiny leaks are sometimes hard to detect. An easy test is made on all water needles at Homestake before they are installed. First, a few drops of penetrating oil are poured into a water needle. Then one end is sealed with a finger as shown. Finally, compressed air is introduced through the opposite end. If a hole is present, no matter how small, a conspicuous white fog will escape through the opening to expose the defect. See Fig. 4. (*Continued on p. 96*)



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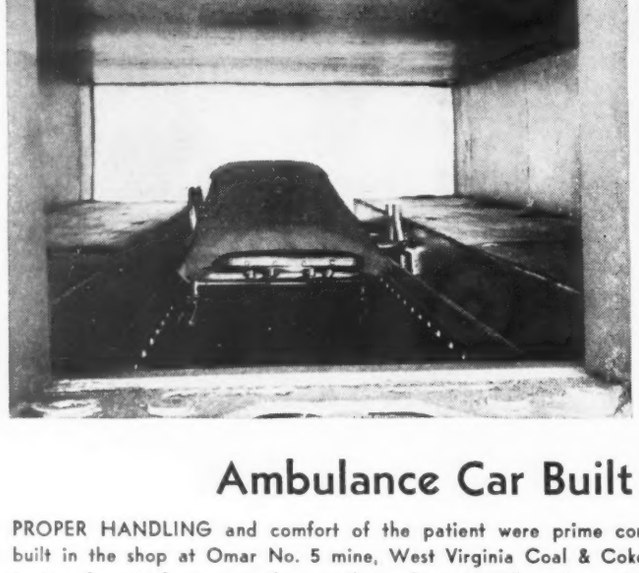
Water Needles Are Shortened. To prevent the frequent breakage of water needles, all water needles are cut back so that the end of the tube is about ¼-in. back of the striking face of the tappet when the tappet is in the rear position inside the tappet rotating sleeve.

Keeping Side Rods Tight With Solid Nuts. Loose side rods on rock drills are a frequent cause of delay. They may loosen up even if two nuts are used to lock the rods in position. Mechanics machined a long closed nut, as shown, and found that side rods fitted with them remained tight. The closed end of the nut prevents peaning of the rods. Although many drills are now fitted with these nuts, mines employing older types of machines will find this idea useful in keeping side rods tight. See Fig. 5.

Solid Shell Cuts Repair Costs. Mechanical engineers at Homestake have long been advocates of a solid guide shell for crank-feed drifters (now incorporated in the design of some rock drills) in preference to types which employ crossheads, rods, and spreaders to support the feed screw at the rear of the shell. The solid shell with a single bushing in the casting keeps the feed screw in perfect alignment, whereas crossheads and bolts supporting feed screws can loosen up, or be bent when the machine is dropped, thus causing excessive wear of the feed screw and shell guideways. It is estimated that feed-screw repairs were cut by 75% with the solid shell.

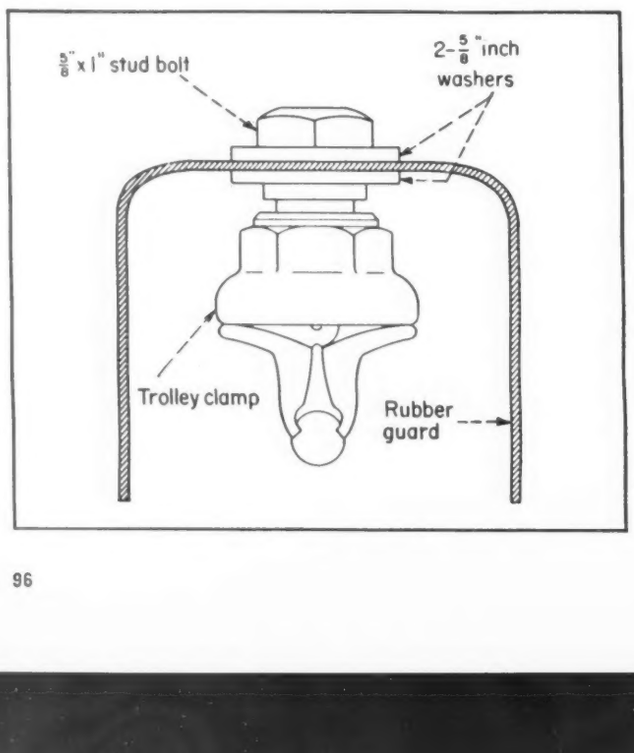
Rounded Splines Prevent Rifle-Nut Wear. Homestake mechanics recommend that square-edged splines on rifle bars be rounded off and polished, and that the flutes be polished, to give longer life to the rifle bars and rifle nuts. Experience has shown that these improvements reduce repairs and replacements without interfering with efficient operation of the drills. Some drills now incorporate these features. See Fig. 6.

Blowing Hose Fitted to Sinkers. The short length of blowing hose attached to sinkers as shown here has long been popular with Homestake miners, and is standard equipment on all sinkers. A few blasts of air controlled by the Claflin "Bang-Pruf" valve near the handle will free any down hole of water and chips. In practice, the miners insert the end of the hose in the drillhole and step on it to hold it in place before blowing the hole. See Fig. 7.



Ambulance Car Built for Patient's Comfort

PROPER HANDLING and comfort of the patient were prime considerations in the construction of this ambulance car, designed and built in the shop at Omar No. 5 mine, West Virginia Coal & Coke Corp., Omar, W. Va. Its totally inclosed construction provides protection from inclement weather on the surface as well as from air currents underground. Elimination of as much sound and vibration as possible was a factor in the design. Compartments on either side of the removable rubber-tired stretcher contain first-aid material and serve as seats for those riding in the car.



Trolley-Wire Clamp Supports Rubber Guard

A SIMPLE METHOD of supporting a rubber trolley-wire guard, that requires, in addition to a standard trolley-wire clamp, only two ⅝-in. washers and a ⅝-in. stud bolt 1 in. long, is suggested in a recent issue of *O-B Haulage Ways*.

As shown in the accompanying drawing, the first step in installing the clamp is to bore a hole through the center of the top of the rubber guard. A washer is put on the stud bolt and the bolt is then forced through the hole from the top. After placing the washer on the underneath side of the bolt, the clamp is screwed onto the bolt. Once the clamp is attached to the trolley wire, the guard is held in place.

Most mines have found that the trolley guard should be supported every 5 ft., the publication points out. However, since hanger supports also hold the guard, only one additional support of this type is required between hangers spaced 10 ft. apart.

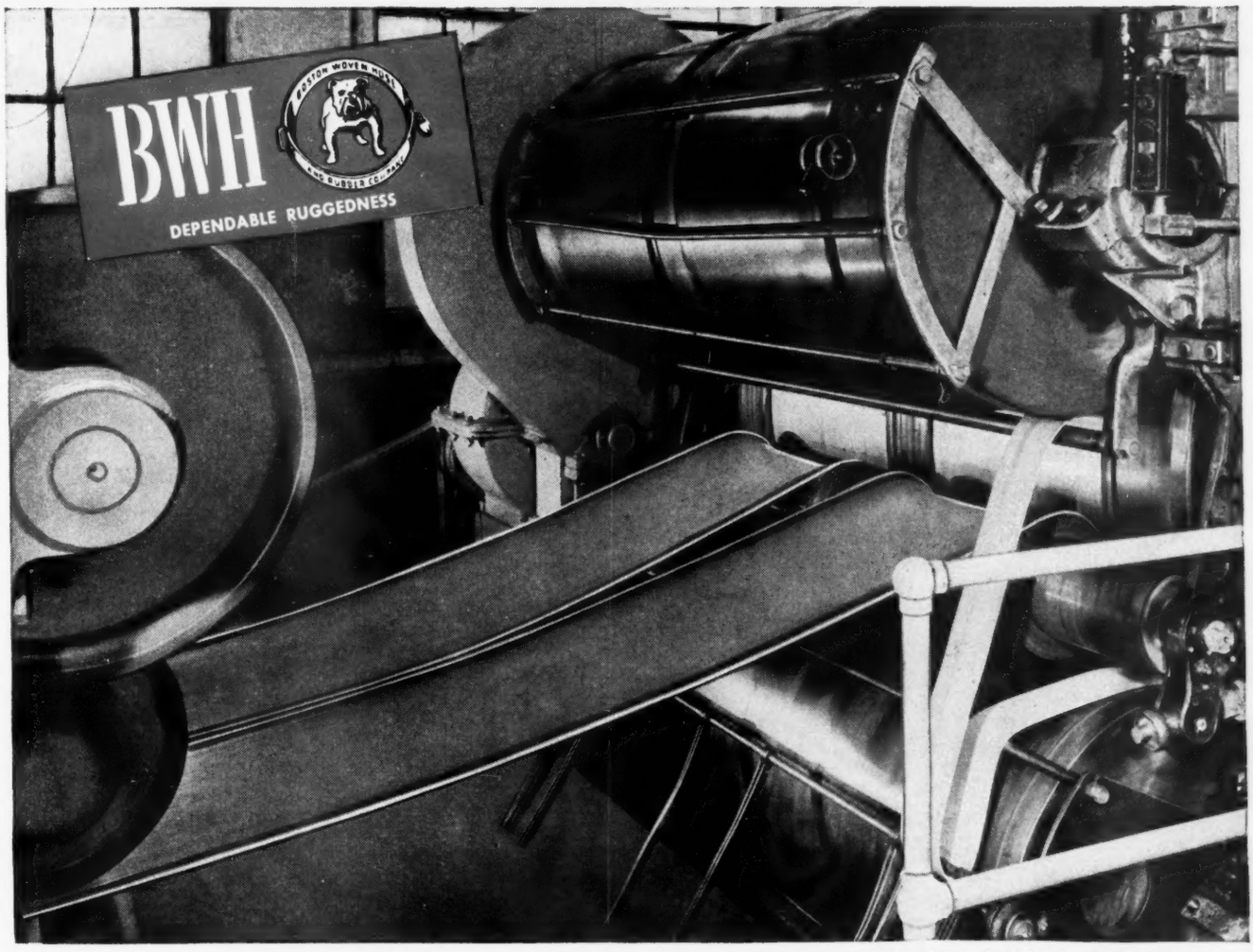


Photo Shows BWH Conveyor Belts Being Produced by the ROTOCURE Process of Continuous Vulcanization.

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Among these advantages are the following:

1. ROTOCURE eliminates press overlaps or overcured segments, through continuous vulcanization. Actual tests prove press overlaps may reduce flex-life as much as 40%.
2. ROTOCURE eliminates mechanical distortion, which occurs at the press ends in the flat-press method of curing.
3. ROTOCURE eliminates uneven stretch, because this process maintains constant, uniform stretch control throughout the curing of every inch of BWH Belts.
4. ROTOCURE eliminates from transmission belts, the dusting agents necessary in flat-press curing to keep belts from sticking to hot platens. Thus BWH Transmission Belts have a higher coefficient of friction, resulting in lowered operating tensions . . . prolonged belt life.
5. ROTOCURE eliminates non-uniform covers in conveyor and elevator belts, because this process never overcures any part of the belts. Thus the rubber covers of BWH Conveyor and Elevator Belts are uniformly abrasion-resistant.

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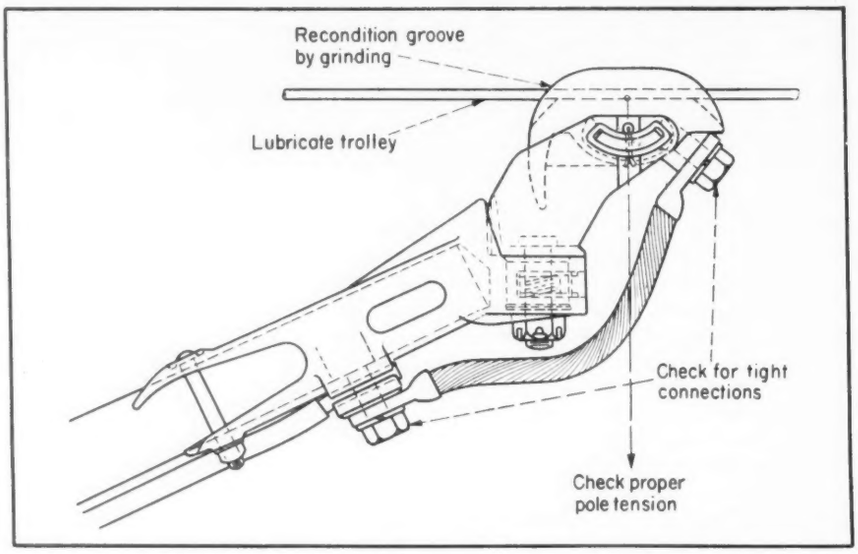
Coal Stored Underground Beats Car Shortage

STORING COAL UNDERGROUND at several West Virginia operations is preventing shutdown of mining sections when mine cars are temporarily unavailable. Coal in this short dead-end room was placed there by shuttle cars and is within a short distance of the shuttle-car elevator. Rehandling it is considered cheaper than laying a section idle when cars are not available. Such rehandling normally is done when the loading unit is caught up with its regular production work or at another appropriate time.



REGULAR ATTENTION to these four points will increase service from both the trolley wire and shoe.

Maintenance Adds Trolley-Shoe Life

PROPER MAINTENANCE can add greater length of service to even the best wearing trolley shoe and also increase the life of the trolley wire, says *O-B Haulage Ways*, in outlining the following four important points to watch in setting up a regular shoe-maintenance program:

1. Use no more pole tension than necessary. Trolley shoes may be operated successfully with a tension of as low as 18 lb. Because of their smooth-riding qualities and long contact surface, shoes will hug the wire tightly and will not dewire in spite of low wire tension.

2. In service, sharp edges and cones will appear at the ends of the shoe. These are damaging to both the collector and the trolley wire and should be removed. After 3/16 in. of the shoe groove has worn, remove the shoe and grind out the groove to its original smoothness. Repeat the grinding process after another 3/16 in. has worn away.

3. Keep the trolley wire properly lubricated. A conditioner that deposits a fine film of graphite on the wire, filling the interstices and providing a smooth, highly burnished surface for the collector, is recommended. Caution should be exerted against using too much lubricant as this builds up on the wire and tends to act as an insulator between the wire and shoe. Experience will show the best frequency to follow in lubricating. A good principle to keep in mind is: "When bright copper begins to appear it is time to lubricate."

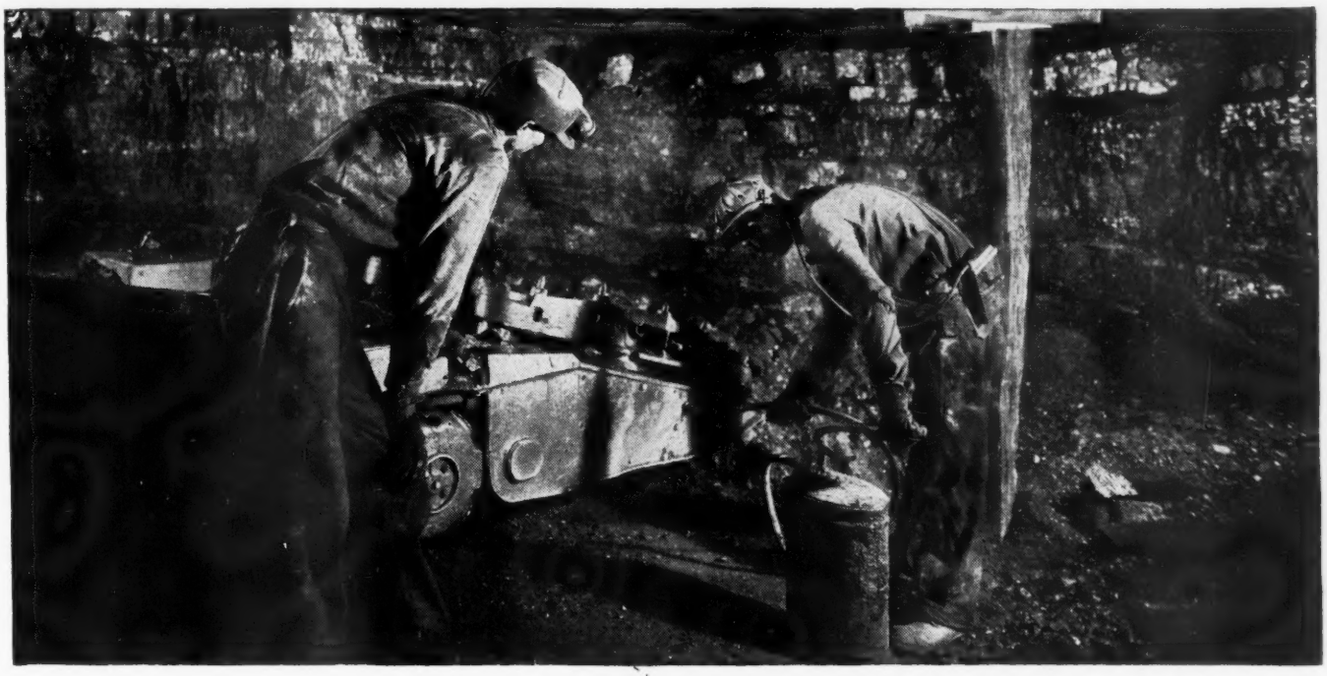
4. See that shunt and motor connections are tight and serviceable. The shunt should be inspected for wear periodically and replaced when necessary.

cut maintenance costs

save production time

simplify lubricant storage and handling

with Gulf Mining Machine Lubricant B



The application of Gulf Mining Machine Lubricant B to this loading machine ended operating difficulties and increased production —typical of results obtained with this quality lubricant in scores of leading mines.

GULF Mining Machine Lubricant B provides better lubrication for cutting and loading machines—helps them produce more at lower cost.

Mining machines produce more because they're in service more — freedom from mechanical troubles makes the difference.

Mining machines cost less to operate because Gulf Mining Machine Lubricant B eliminates excessive wear. As a result, maintenance and repair costs go down and stay down.

And lubricant storage and handling is simplified because Gulf Mining Machine Lubricant B does the job of two or three other lubricants—provides effective lubrication for both plain and antifriction bearings and for gears in drives and transmissions.

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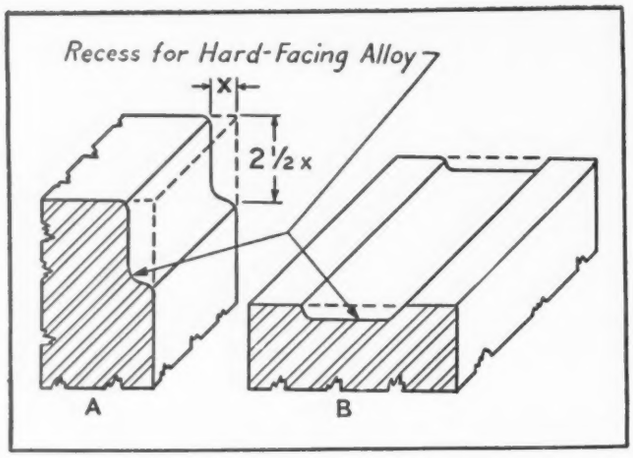
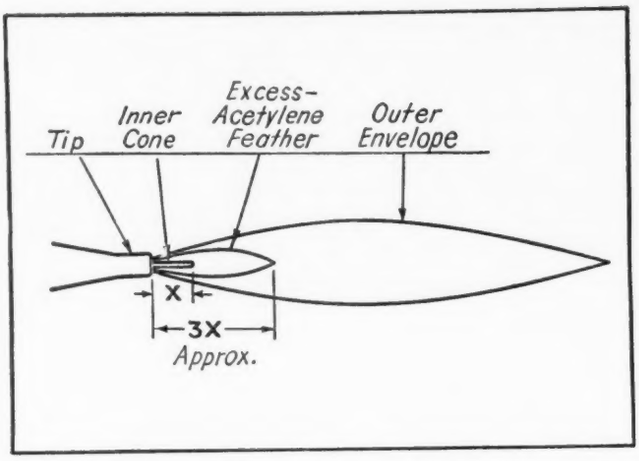
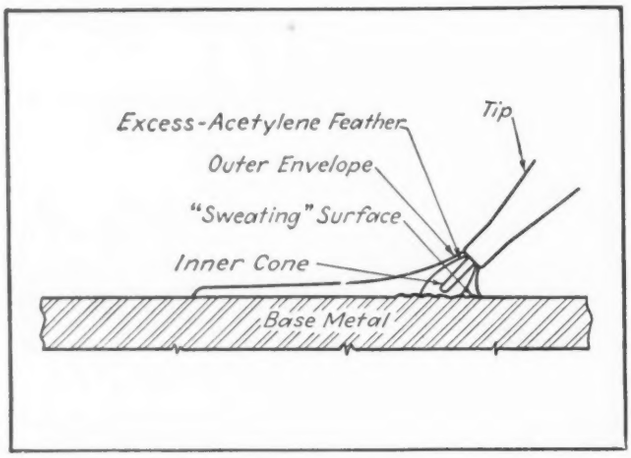


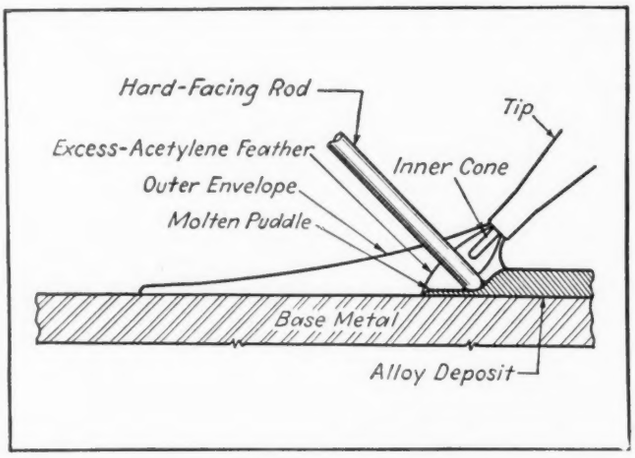
1 HOW THE WORKING SURFACE must be prepared for hard-facing.



2 THE WELDING FLAME should be adjusted with an excess of acetylene.



3 HOW THE FLAME is applied to the work at the starting point of the operation.



4 THE FLAME IS POINTED partly on the puddle and partly on the metal next to it.

Simple Steps in Hard-Facing

THE FOLLOWING SUGGESTIONS on hard-facing, illustrated in the accompanying sketches, appeared in a recent issue of Linde TIPS.

In preparing the working areas which are to be hard-faced, all loose scale, dirt, rust or other foreign substances must be removed, preferably by grinding or machining. When the hard-facing material is to be applied to a groove or recess, it is important to round-off all corners. This will help prevent local overheating of the base metal. The dotted lines in the sketch indicate the finish ground dimensions of the hard-facing material.

The flame of the acetylene torch should be adjusted so it has an excess of acetylene, with a bright secondary flame, or feather, surrounding the inner cone. Generally, this feather should be three times the length of the inner cone. If an excess-acetylene flame is not used, the hard-facing material will not spread uniformly and may become porous.

In manipulating the flame, the inner cone is held about ⅛ in. from the surface to be hard-faced. Heat is applied to a spot until it becomes glazed, showing that an extremely thin surface layer has melted. This condition, known as "sweating," must be present before the hard-facing rod can be applied. The "sweat" area will extend about ¼ in. around the acetylene feather of the flame.

The hard-facing rod should be directed into the flame so that the tip of the inner cone just about touches the rod and the end of the rod lightly touches the "sweating" metal. Melt just enough rod to form a puddle on the surface of the "sweat" area. Then withdraw the rod and spread the puddle with the flame. Do not stir with the rod. Melt off more rod as it is needed. With a little practice, a welder will be able to work continuously by pointing the flame partly on the puddle and partly on the metal next to it.

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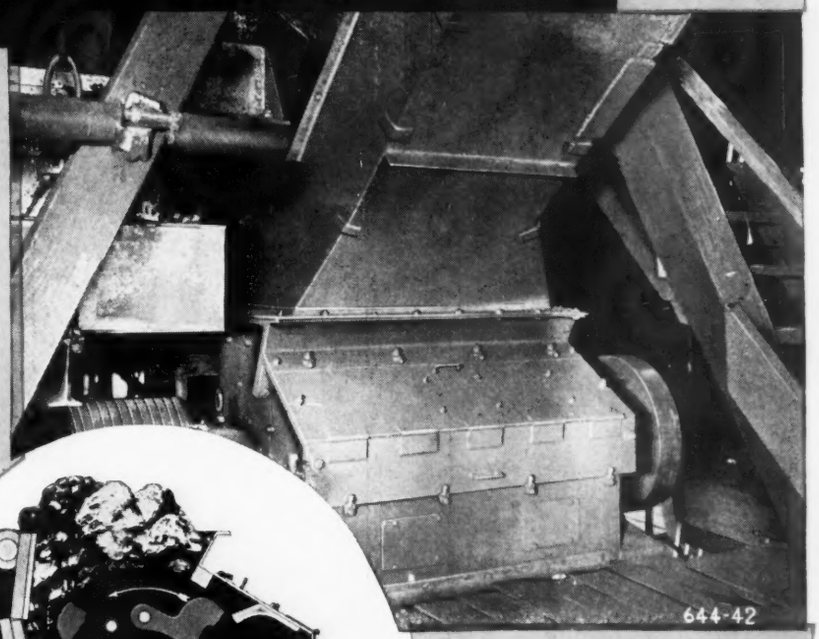
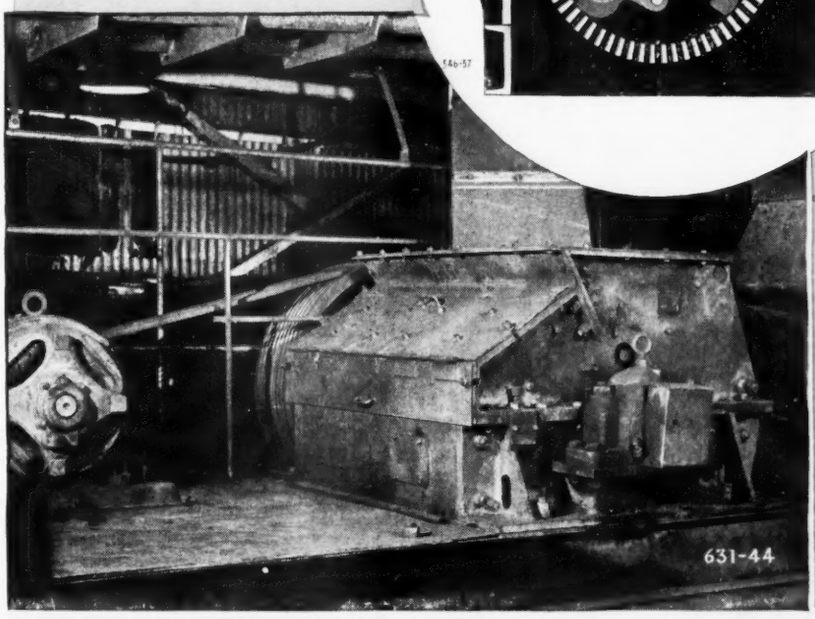
Jeffrey FLEXTOOTH CRUSHER

(PATENTED)

A size for every need





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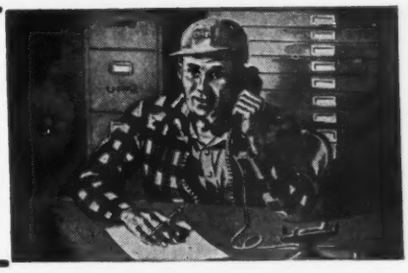

NCA Establishes Safety Division

Creation of a Safety Division and the appointment of Earl R. Maize as its director was announced by National Coal Association Feb. 15. Mr. Maize, a graduate of Pennsylvania State College in coal mining engineering, has been associated for 20 years with the U. S. Bureau of Mines in capacities having to do with safety, accident prevention, first-aid, and mine rescue training. He will have headquarters in the offices of National Coal Association.

"NCA has always contended that safety is a matter of education and the intelligent application of reasonable rules," stated the announcement. "The industry is proud of the tremendous improvement that has been made and, with complete safety consciousness to spur it on, can expect even greater things. The appointment of Mr. Maize and the establishment of a Safety Division are intended to accelerate and intensify the industry's continuing efforts in accident prevention."

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Advisory Council Formed

Robert P. Koenig, president, Ayrshire Collieries Corp., was named chairman of the newly formed Bituminous Advisory Council at a meeting in Washington, D. C., Feb. 17. The council was formed, at the invitation of Secretary of the Interior Krug, to advise the government on industry problems. Addressing the 16 industry representatives in attendance, Secretary Krug urged the council to direct its attention to the coal-car and mining-equipment shortages. Other officers elected at the meeting were: vice chairman, Ezra Van Horn, executive vice president, Ohio Coal Assn.; and secretary-treasurer, James Morgan, vice president, C. A. Hughes & Co.

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New Developments

• Sale of the Tierney mine and other assets in and around Stone, Ky., to the Portsmouth Steel Co., was announced early last month by Lewis C. Tierney, president, Tierney Mining Co., Bluefield, W. Va. The sale included the mine, which has a rated capacity of 1,500 tons a day, a five-track tipple, store and office building, homes and an undisclosed area of undeveloped coal land. The purchase, however, does not affect the organization of The Tierney Mining Co., the new Peg Branch mine now under development or other holdings.

The Portsmouth Steel Co. reportedly completed the purchase to assure itself a coal supply for its steel operations and also is reported to have recently acquired another mine at Freeburn, Ky. The Tierney mine will be owned by a Portsmouth subsidiary, the Black Gold Coal Corp., and operated by another subsidiary, the Emperor Coal Co. The mine operation will continue for the present under George B. Baker, who has been vice president and general manager for the Tierney company, and little change in operating personnel is expected. Under the arrangement, sufficient coal from the mine will be supplied the Eastern Coal Sales Co. to meet existing contracts.

• The Clinchfield Coal Corp., Dante, Va., is developing a new deep mine at Elk Creek, Barbour County, W. Va., which is expected to be opened late in 1948 or early in 1949, with an eventual production of 1,000,000 tons a year. A cleaning plant with a capacity of 400 t.p.h. is under construction, and the B. & O. spur being built to serve the property will include a 3,000-ft. tunnel.

• ICC authority for construction by the Louisville & Nashville R. R. of an extension of its Leatherwood line to Blair Fork was received last month and construction was expected to begin shortly. The new line will open up a large new coal tract, plans for the development of which have previously been announced by The Kentucky River Coal Corp., the Jewell Ridge Coal Corp. and the Fourseam Coal Corp. (*Coal Age*, January, p. 98).

• The recently incorporated Farland Fuel Corp., Monongahela Bldg., Morgantown, W. Va., has acquired the Katherine mine of the Katherine Coal Mining Co., Lumberport, W. Va., which has a capacity of 3,000 tons daily. Officers of the company are: Joseph S. Farland, president, William H. West Jr., vice president, and Lee R. Christopher, vice president, operations. The Christopher Fuel Corp., whose officers are the same as those of the Farland Fuel Corp., has acquired the Christopher No. 5 mine of the Christopher National Coal Co., National, W. Va., also rated at 3,000 tons daily. Howard A. Feathers is superintendent of the operation. With the transfer of the National mine, Frank E. Christopher, president of the Christopher National Coal Co., has retired from active participation in the coal industry. During the past few years he has disposed of five operations.

• United States Collieries, Inc., New York, has opened a strip operation at Belington, W. Va., on the Western Maryland R. R. The Pittsburgh seam is being mined and production is 500 tons daily at present. Charles H. Lambur is president and general manager (*Coal Age*, February, p. 134).

• Jamison Coal & Coke Co., Greensburg, Pa., has opened a new mine in the Connellsville basin, which is to be known as the Jamison No. 22 mine. The property formerly was operated by the U. S. Steel Corp.

• Ten-X Coal Co is reportedly developing a new mechanized deep mine at Roseville, Ohio. The operation, which will include a new tipple, now is producing 800 tons a day and will have an eventual capacity of 1,500 tons daily.

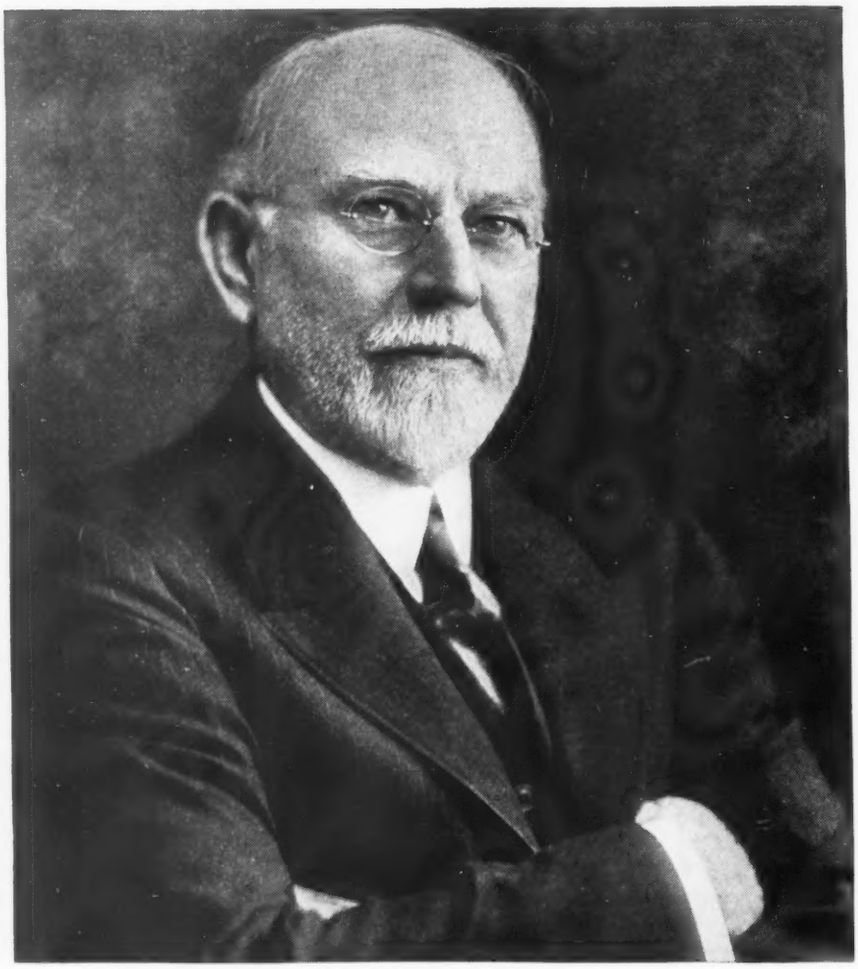
• Big Seam Coal Co., Corbin, Ky., is opening a new drift mine, to mine the Dean, Jellico and Blue Gem seams. A tipple to prepare all sizes is being erected. Initial tonnage is 200 tons daily, later increasing to 1,500 tons a day.

• Peacock Coal Co., Pomeroy, Ohio, is developing a drift mine at Meigs, Ohio, on the N. Y. Central R. R. The No. 8 seam is being mined and ultimate capacity will be 1,200 tons daily.

• The S. & N Coal Co., St. Clairsville, Ohio, is operating a strip mine at Byesville, Guernsey County, Ohio, on the Pennsylvania R. R. The No. 7 seam is being stripped and production is 500 tons daily.

• The Sunday Creek Coal Co., Columbus, Ohio, is reportedly building a loading tipple with a minimum capacity of 1,000 tons daily on the N. Y. Central R. R. near Middleport, Ohio.

McGraw-Hill Founder Dies



JAMES H. McGRAW, founder of the McGraw-Hill Publishing Co. and dean of industrial publishers, died Feb. 21 at the age of 87 in San Francisco, Calif., after a long illness. Mr. McGraw had resigned as chairman of the company's board of directors in 1935, being succeeded by his son, James H. McGraw Jr., who also became the firm's president. Even after his retirement, however, the elder McGraw maintained an alert interest in the company, as well as the nation's industry and business.

Starting his publishing career in 1884 as a subscription salesman in New York City for the *American Journal of Railway Appliances*, Mr. McGraw's progress was steady and colorful, culminating in the building up of the largest industrial publishing organization in the world, with 26 national and eight international magazines, and the McGraw-Hill Book Co., largest publisher of technical and industrial books. In 1917, when the Hill Publishing Co. and the McGraw Publishing Co. were consolidated, *Coal Age*, founded in 1911 by the Hill interests, became a member of the larger enterprise.

In 1886, Mr. McGraw became part owner and vice president of the railway-appliance magazine. Later, he and his partner split on the importance of Edison's new electric streetcar, for which his partner saw no future, preferring to sell advertising to suppliers of horses, feed, wheelbarrows, pitchforks and harness. After gaining full control of the business, Mr. McGraw's first official act was to hire an electrical editor.

From that time on, he based the growth of his publishing on the five major engineering professions and allied industries. By 1901, he had acquired *Electrical World* and *Electrical Engineer*, later merged as *Electrical World*. Soon, he added *Engineering Record*, *Chemical and Metallurgical Engineering* and *Electrical Merchandising*.

After the death of John A. Hill in 1916, Mr. McGraw acquired the Hill publications — *Coal Age*, *American Machinist*, *Power*, *Engineering News* and *Engineering and Mining Journal* —and thus launched the McGraw-Hill group with nine publications.

Earlier, in 1909, the McGraw and Hill book houses had been merged as a separate company, the McGraw-Hill Book Co., which now publishes some 2,400 titles in all branches of pure and applied science, economics, business and social sciences. Whittlesey House, trade division of the book company, was established in 1930 and expanded in 1940 to include fiction.

Throughout his publishing career, Mr. McGraw insisted on editorial improvement and authority and on high advertising ethics. Editorial leadership, he contended, was based on constant field contact with industry and active participation by editors in industrial activities. He was no less insistent on truth in advertising and the responsibility of the business press for efficient development of markets. Likewise, he believed in honesty in circulation data and, with Mr. Hill, was the first industrial publisher to print total circulation figures in his magazines.

Mr. McGraw was an acknowledged leader in business publishing and in teaching men how to do their jobs better. In 1927, he was given the Bok gold medal "for distinguished personal service rendered American commerce and industry through raising the standards of advertising." In 1929, he received the degree of Doctor of Commercial Science from New York University as "an educator transformed into publisher, who has never ceased to be an educator," a citation referring to his early years as a schoolteacher and superintendent at Fredonia, N. Y. Later, in 1924, the Fredonia State Teachers College alumni association named him, along with Edwin C. Markham, for the school's "Distinguished Service Certificate."

In 1924, Mr. McGraw established the annual award that bears his name "to encourage constructive thinking for the advancement of the electrical industry." He was conspicuous also in other aspects of public and civic life, taking an active interest in politics, the Y. M. C. A. and professional, social and university organizations, including the A.I.M.E., A.S.M.E., National Electric Light Assn., Illuminating Engineering Society, New York State Chamber of Commerce, English Speaking Union and the Union League, Engineers', Railroad, Republican, Chemists' and Princeton clubs of New York City and the Cosmos Club of Washington, D. C.

Mr. McGraw's four sons now are officials of the company he founded. James H. McGraw Jr. is president and chairman of the board, Harold W. McGraw is vice president in charge of the McGraw-Hill building at 330 West 42nd St., New York City, Curtis W. McGraw is senior vice president and treasurer, and Donald C. McGraw is vice president in charge of manufacturing. A daughter, Catherine, now Mrs. John E. Osmun, lives at Madison, N. J.

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Water Suction Hose is generally subjected to rough usage. Thermoid has studied carefully the service conditions under which it is used and has designed several types from which you can pick the one best suited to the job you have to do.

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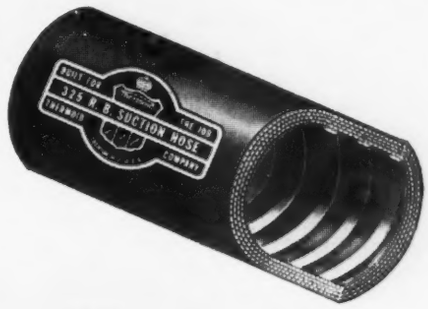
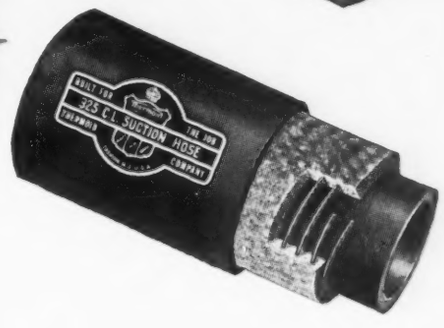


This hose is made in smooth or rough bore. Use smooth bore when sand, dirt or other abrasives are in the water to be handled. Use the more economical rough bore type when the water is free of abrasives. Each type has a high quality tube, strong wire reinforcing, then plies of specially woven duck with a weather and abrasion resisting cover. Supplied in sizes 1¼" to 6" in lengths up to 50 ft.

For Less Severe Service Use Thermoid #350 Type

Somewhat lighter in construction, but with plenty of long life quality for less severe jobs. This hose comes in smooth or rough bore, wire and duck reinforced, with weather and wear resisting cover. Supplied in sizes 1½" to 6" and in lengths up to 50 ft.

For Normal Light Duty Use Thermoid Type #325-CL



It's an economical hose for normal light duty service. The water way is smooth, resistant to action of gritty particles, the reinforcement of high carbon steel wire interwoven with heavy cotton yarn, cover of sufficient thickness and strength to resist abrasion and rough handling. Furnished in sizes of 1½" to 6", in lengths up to 50 ft.

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Technology, Mining Methods Highlight A.I.M.E. Coal Meet

TWENTY-TWO PAPERS on coal technology, safety and ventilation, preparation, utilization, mining methods and reserves, plus a day-long symposium on thickening and filtration, drew more than 200 coal men to the annual meeting of the A.I.M.E. at the Pennsylvania Hotel, New York City, Feb. 16-18. Sharing interest with more technical papers, a forecast by Andrew B. Crichton, mining engineer, Johnstown, Pa., that minable reserves of coal may possibly last no longer than 250 years sounded a call for a new survey of the nation's coal resources.

Recovery of anthracite fines from a silt bank containing 1,500,000 tons of material was described in a paper by V. H. Wilson and W. L. Dennen, Hudson Coal Co., Scranton, Pa. Forty-eight Humphreys separators, arranged in eight batteries of six spirals each, produce usable boiler fuel in sizes from 3/32 in. to plus 200-mesh, with cleaned coal ranging from 10.8 to 21 percent ash and feed from 19 to 41.5 percent ash (June, 1947, *Coal Age*, p. 85). In addition to supplying fuel for nearby power plants, recovery of these fines helps solve stream-pollution problems. For this reason and others, it was pointed out, the practice may well spread to other areas in the anthracite field.

Research in bituminous flotation at the Champion No. 1 plant of the Pittsburgh Coal Co., Library, Pa., was summarized in a paper by R. E. Zimmerman, preparation engineer, Hanna Coal Co., who declared that cleaning bituminous fines by flotation methods in the laboratory can be duplicated in full-scale plant practice. Mr. Zimmerman's conclusions included the following: (1) it is best to confine flotation to minus 28- or 48-mesh; (2) a moderate quantity of soluble salts has little effect on flotation but a high quantity retards the action; (3) alkalinity or acidity of the water affects the floatability of coal and pyrites; (4) highest recovery is obtained in a pH range of 7.0 to 7.5; (5) a brittle rather than a tough froth is preferable; and (6) bulk oil flotation removes coal from clay and is superior to froth in treatment of extreme fines but this method picks up all carbonaceous material and is costly.

"Thermal Drying of Fine Coal," outlining the performance of various dryers now being manufactured, was the subject of a paper by O. R. Lyons and A. C. Richardson, Battelle Memorial Institute, Columbus, O. Data were presented on 24 dryers—nine screen-type, eight rotary-type, three continuous-pallet-type, two flash-type, one tray-type, and one cascade-type—as a guide for determining the best type for any given drying problem. Mr. Lyons, who read the paper, pointed out that operating costs range from 8c. to 18c. per ton of dried coal and from $1 to $3.50 per ton of water removed. Maintenance costs, it was stated, may be reduced by coating ducts, housing and exhausts, using corrosion- and fly-ash-resistant fan impellers, using stainless steel for screens and other exposed surfaces, installing controls to prevent overheating and setting up a planned maintenance program. Performance can be improved by eliminating heat losses due to air infiltration, operating at a steady rate, checking controls regularly and training operators carefully.

Complex cleaning processes and frequent round-the-clock operation create major maintenance problems, declared Ralph Hunter, Rochester & Pittsburgh Coal Co., Indiana, Pa., who read a paper on "Maintenance of a Coal-Cleaning Plant." Good maintenance, he declared, can be achieved by (1) a design that makes all parts of the plant accessible; (2) a layout that provides parallel rather than line operation to avoid total interruption; (3) operation within designed capacity, with scheduled shutdowns of 3 to 4 hours a day for routine inspection and maintenance; (4) fixing responsibility for maintenance; (5) assigning skilled men to the crew; (6) keeping records as a help in planning shutdowns and maintaining inventory of spare parts; and (7) regular checks on motor loads.

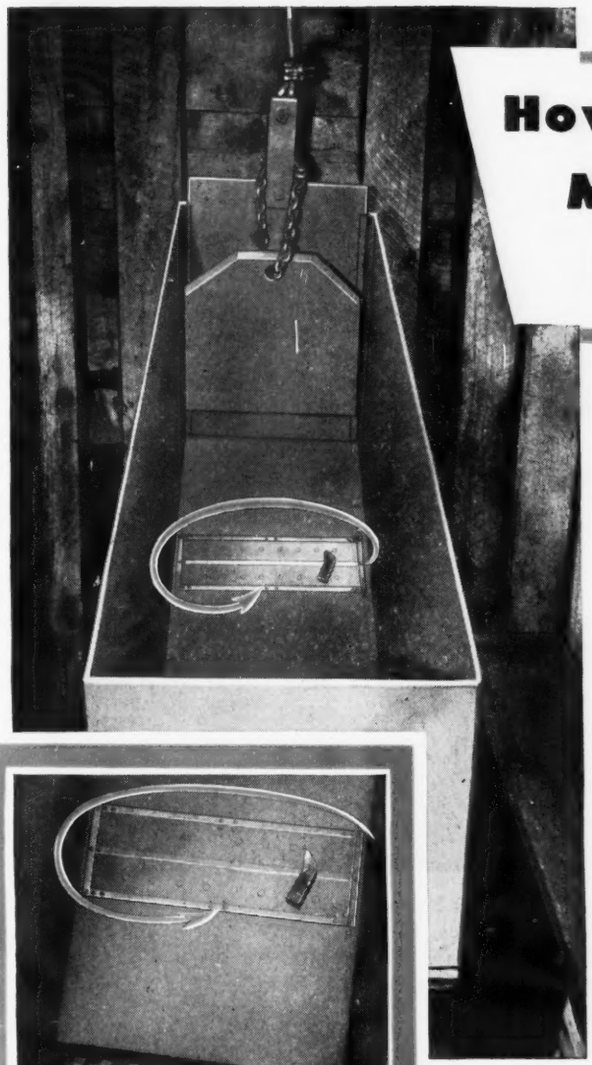
"Design and Application of Mine Dams in Anthracite Regions of Pennsylvania" was the title of a paper by H. A. Dierks, Glen Alden Coal Co., Scranton, Pa., at the opening of the Monday afternoon session. In terms of hydrostatic pressure to be withstood, Mr. Dierks classified mine dams as follows: low-pressure, 1 to 30 lb. per sq. in.; medium-pressure, 31 to 100 lb.; and high-pressure, over 100 lb. The first may be built of wood but the last two must be built of concrete or masonry. Location and design of dams are determined by the surrounding strata and the pressure to be supported but no dams should be less than 30 in. thick, he contended.

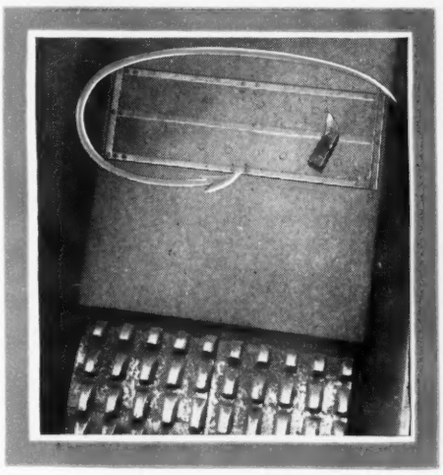
A plan that has kept major stripping equipment at work maximum hours for 21 years was described in a paper by H. E. Howard Jr., Pyramid Coal Corp., Chicago. In Mr. Howard's absence, his paper was read by Louis Turnbull, U. S. Bureau of Mines. Features of the maintenance plan are these: (1) accurate records of breakdowns and maintenance needs, major replacement items required, etc.; (2) an annual maintenance budget listing major repair and replacement jobs that will have to be done and setting up a shutdown schedule; (3) issuance of job orders well in advance to guarantee that supplies will be on hand; (4) full description of each maintenance and replacement job to guide future work, and (5) a reserve fund levied on tonnage and paid into the maintenance fund each month. Advantages of this plan include the following: (1) requirements of money and materials are known in advance; (2) the monthly tonnage levy spreads costs; and (3) bookkeeping and cost accounting are simplified and peaks and valleys in costs are avoided.

Roof control practices in England and south Wales have minimized subsidence, said J. W. Buch and Andrew Allen Jr., U. S. Bureau of Mines, whose paper followed Mr. Howard's. Chief method for control has been block-and-strip packing. The speakers declared that the Bureau is collecting further data on this method, as well as on ways to measure subsidence, which may be useful in the anthracite regions of the United States, especially when mining goes deeper.

Thickening and filtration was the subject of the joint session of the Coal Division with the Milling Methods Committee and the Industrial Minerals Division that lasted all day Tuesday. Centrifugal and diaphragm pumps, electrical controls, flocculation, wetting compounds and other related subjects were discussed by a panel of six experts, as follows: G. M. Darby, The Dorr Co., Inc.; R. J. Morton, Oliver Iron Mining Co.; W. B. Stephenson, Allen-Sherman-Hoff Co.; Marlowe Hardinge, The Hardinge Co., Inc.; I. M. LeBaron, International Minerals & Chemical Corp.; W. L. McMorris, H. C. Frick Coke Co.; and D. F. Irvin, Oliver United Filters, Inc. Starting points of the discussion were two papers: "Thickening—Art or Science?" by E. J. Roberts, research director, The Dorr Co., Inc., and "Heavy Media Separation," by Grover Holt, Cleveland-Cliffs Iron Co. Among other points growing out of the papers and the discussion were the following: (1) the choice between centrifugal and diaphragm pumps for thickener underflow depends on the quantity of materials to be handled and what must be done to the materials; (2) equipment can be partially protected against power failures by interlocking and automatic controls to avoid overloads; (3) sludge accumulations during shutdown can be avoided by operating underflows 24 hours a day; and (5) solids in raw feed should be measured by volumetric percent rather than weight percent.

The coal industry appears to rely on slip-shod methods of measuring air underground, said Cloyd M. Smith, consulting engineer, in "Underground Anemometry," the first paper of the Safety and Ventilation session Tuesday afternoon. While stressing that his report had yet to be approved by





Shown above is a typical Eriez installation in a gravity flow chute protecting a coal crusher. Built the exact width of the chute, it provides efficient and economical tramp iron removal for the Jeff Mining Co., Oakdale, Penna.

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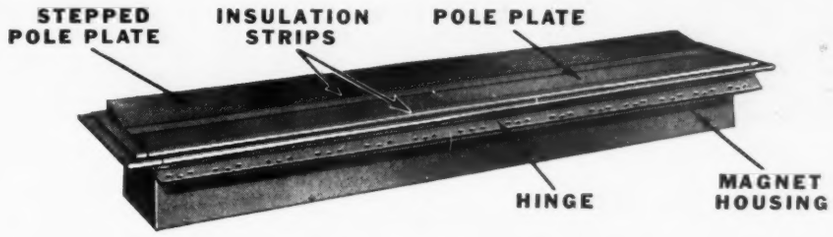

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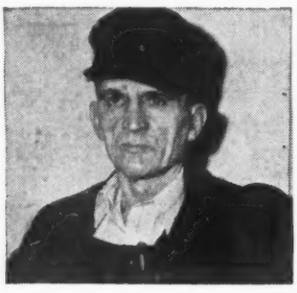
T. C. Hogeland (left) fireboss, T. L. Ferguson, Odell Jones and H. Sullivan, section foremen, and E. V. Smith, district foreman, day shift, Praco mine, Alabama By-Products Corp., Praco, Ala.

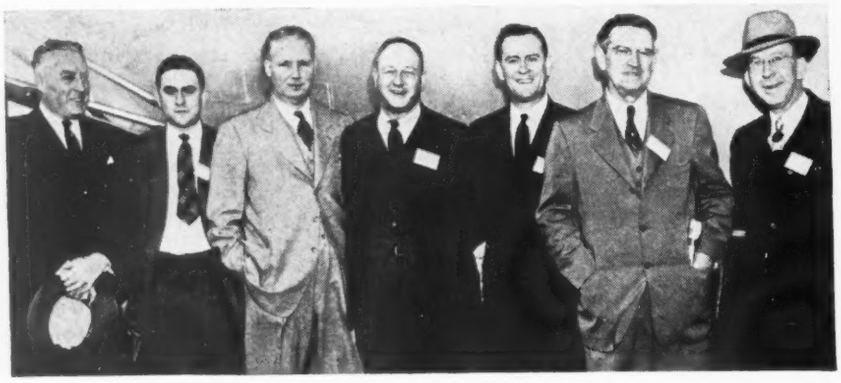
M. B. Rafter (left), 2nd shift foreman, and Dorsey Humpreys, face boss, Warwick mine, Duquesne Light Co., Greensboro, Pa.

COAL MEN



Left to right—W. I. Strunk, general superintendent, Blue Diamond Coal Co., Eagan, Tenn.; Elmer H. Sutton, A. Dickinson, and E. Quinn, face bosses, St. Ellen mine, Perry Coal Co., O'Fallon, Ill.

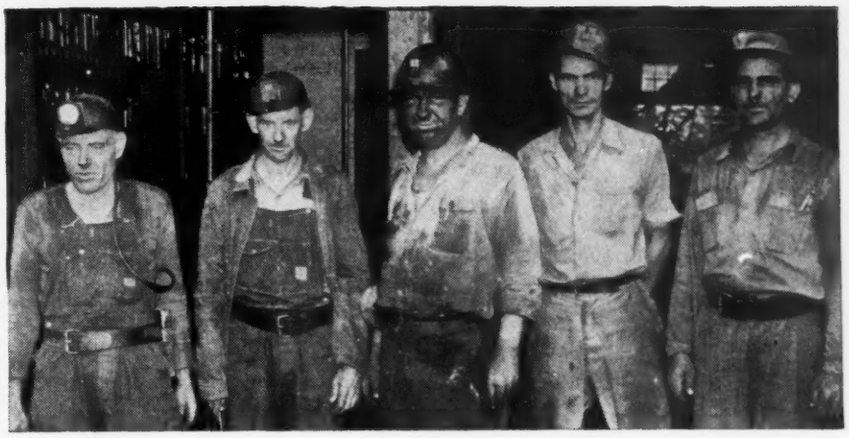
Left to right—Wren Davis, tipple foreman, and W. R. Barwick, chief electrician, Eagan mine, Blue Diamond Coal Co., Eagan, Tenn.; Harlan A. Walls, superintendent, and C. E. Duncan, chief electrician, Rosedale mine, Diamond Coal Mining Co., Devonia, Tenn.



W. H. Summers (left), Goodyear Tire & Rubber Co.; K. F. Jackson, Amherst Coal Co.; E. H. Hebden, Jeffrey Mfg. Co.; Andy F. Whitt, chief engineer, Rail & River Coal Co.; P. F. Samples, Electric Supply Co.; John T. Sydnor, president, and J. E. Wilson, general superintendent, Rail & River.

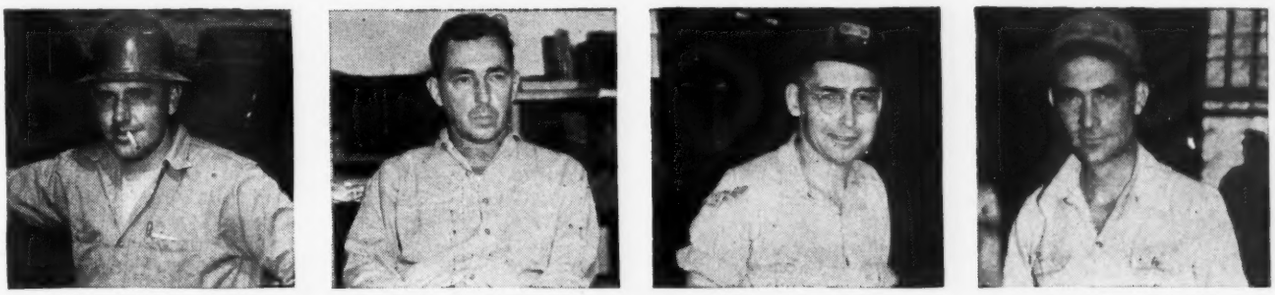
Roscoe Gibson (left), chief electrician, Blue Rose mine, and C. J. Barton, assistant general superintendent, New Jellico Coal Co., Morley, Tenn.

A. L. McDonald (left), shop foreman, and V. R. Kaylor, clerk, central shop, DeBardeleben Coal Corp., Sipsey, Ala.



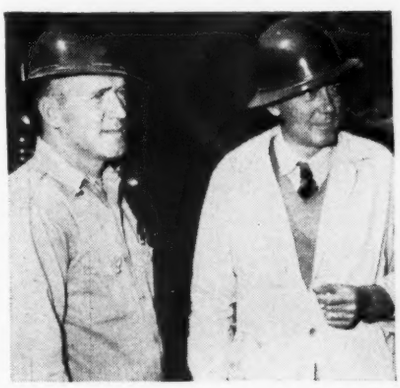
Dewey Kennedy (left) and Dewey Baird, face bosses, T. R. Rice, chief electrician, Ben Hamblin, lampman, and Elery Barnes, acting superintendent, Marion mine, Black Diamond Coal Mining Co., Marion, Tenn.

ON THE JOB



Left to right—Robert Harmon, pit foreman, Georgetown No. 12, Hanna Coal Co., St. Clairsville, Ohio; G. C. Dyar, superintendent, C. J. Hager, engineer, and G. S. Hager, washer foreman, Stith Coal Co., America, Ala.

Left to right—Ed Claiborne, superintendent, and Hobert Robbins, tipple foreman, Block mine, Carryville, Tenn., Wayne Justice, tipple foreman, and H. L. Sharp, chief electrician, Indian Creek (Tenn.) mine, Diamond Coal Mining Co.



Homer King (left), drilling and blasting foreman, and Otis Bledsoe, assistant to the general superintendent, Georgetown No. 12 mine, Hanna Coal Co.

F. C. Payne, (left), assistant mine foreman, Hugo Shamblen, general mine foreman, Charles Herdon, inside maintenance foreman, and J. H. Barnett, outside foreman, Federal No. 3 mine, Coal Division, Eastern Gas & Fuel Associates, Everettville, W. Va. (photo, courtesy, E. G. & F. "Associate").

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JOY DIVISION

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GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

the Ventilation committee, of which he is chairman, Mr. Smith outlined the results of a survey on anemometry conducted among committee and non-committee members.

The answers indicated little uniformity in methods of holding the anemometer, previous calibration, traversing an area, measurement of a section or consideration of the effect of regulators. Mr. Smith maintained that present methods are not producing accurate results and that just because subsequent checks with such methods prove consistent, they are not necessarily correct. He recommended research to evolve a standardized technique that could be easily taught mine personnel. Comments from the floor were in general agreement that while some standardization might be useful, extreme accuracy was not normally needed.

Primarily, "management must be 'sold' as to the need and value of a real safety program," said J. D. Cooner, safety engineer, Hudson Coal Co., Scranton, Pa., in a paper on "The Foundation of Safety Engineering and Planning." "Management is either for it or against it"—forget it if they are not fully behind the program, he said. The safety engineer and his inspectors should have experience as miners and officials, Mr. Cooner emphasized, but the safety department must not be made a dumping ground for men physically unable to carry on as mine officials. The safety engineer should be able to talk, write and "sell" safety continuously in his contacts with mine officials and workers.

The safety department should report directly to the operating head of the company, Mr. Cooner stressed, so that it is under no obligation to any mine or plant official. A properly planned and executed safety program will pay for itself in preventing human suffering and at the same time save the employer money in medical care, compensation and production, Mr. Cooner concluded.

In a paper, "Oil and Gas Wells Drilled Through Workable Coal Seams," Arch J. Alexander, chief, West Virginia Department of Mines, outlined the operation of the department's oil and gas division created by the Oil and Gas Law of 1929. Prior to its passage, 64,000 wells had been drilled in West Virginia. About 30,000 of these had been abandoned, on many of which no records existed. Several mine explosions had been attributed to cutting into uncharted wells and improper plugging of others. The department now has on file complete records on some 23,000 wells drilled since 1929.

While we have much national publicity on major mine disasters that at times creates a furore in the federal government and starts a flood of adverse criticism with endless revision of safety regulations and practices costing the industry millions of dollars annually, "yet we have in haulage accidents something like twice as many fatalities as we have in major disasters, plus a great number of non-fatal injuries, with only a meager attention given to this classification of accidents," said Andrew Hyslop Jr., chief engineer, Hanna Coal Co., in a paper on "Transportation Hazards—Cause and Prevention." In a series of slides, based on safety records of several states, Mr. Hyslop showed that while improvement was being made in various classes of accidents, haulage was showing little or no gain.

Proper safety training of all employees would do more than anything else to reduce accidents in haulage and other operations, he pointed out. A survey of industrial accidents showed that for every major injury there are 29 minor injuries and 300 accidents without injury, all from the same cause. These 300 accidental happenings give the most fertile field for accident-prevention work. In this education the foreman is the key figure and he should be helped by a safety engineer to train his men properly. The bulk of haulage accidents, about 75 percent, are classed as struck, run over or squeezed. These occur mostly at the face region and thus emphasize the foreman's part in reducing them.

"I know of no other phase of mining which is operated with as poor equipment in general as the average haulage system," said Mr. Hyslop. A high percentage of mine cars in service today are of crude design. Larger cars of improved design, with automatic and semi-automatic couplings now going into service, offer considerable safety advantages.

"In the average mine locomotive now in use, we find one of the worst examples of poor safety design," Mr. Hyslop said. "The design of most present-day locomotives is very little different from those built thirty or forty years ago in safety features. In conventional locomotive construction, the operator and trip-rider are given very little consideration." Mr. Hyslop went on to illustrate with slides how Hanna has rebuilt locomotives to provide seating space for the motorman and triprider, eliminate the hazards of falling out and offer better protection in collisions. The square-end bumper was removed and a semi-circular plate of rolled steel up to or near the height of the locomotive frame is installed (*Coal Age*, November, 1946, p. 88). It has been found that in a derailment the conventional square-end locomotive tends to turn at right angles if it hits a rib post or other obstruction, with the full inertia of the moving trip suddenly expended on the locomotive. With the rounded ends, the locomotive tends to be guided parallel to the track and may bring the trip to a stop with no damage to equipment or personnel. During three years' experience with these rebuilt units, serious or possibly fatal injuries have been prevented in many cases.

Wednesday morning's session opened with a paper on "The Use of Coal in the Zinc Industry," by W. M. Peirce, assistant to the general manager, New Jersey Zinc Co., Palmerton, Pa., who stated that the zinc industry at present production rates uses coal and coke, including gas-producer coal, to a total of 1,500,000 tons a year. Of this total, one-fifth is used for gas and is subject to the usual requirements for gas-producer use, 100,000 tons goes into high-quality briquets and the remainder is low-volatile fine sizes, with low sulfur and low ash.

The action of micro-organisms in forming acid mine water was discussed by W. A. Koehler, West Virginia University, who read a paper prepared jointly with M. E. Hinkle, Bituminous Coal Research, Inc. Tracing the chemical changes that produce ferric oxide, the speaker stated that exposure of sulfur and sulfur pyrites to air, after coal is removed, forms sulfuric acid. Samples of mine drainage have yielded bacterial colonies which appear to be an important factor in converting ferrous sulphate into ferric sulphate. Other bacteria, whose identity is not yet established, may be the cause of ferric-oxide formation. Mine sealing is the most effective control yet devised but further developments may come from a grant made by B.C.R. to West Virginia University for further study of the action of micro-organisms.

In the discussion following Dr. Koehler's paper, H. F. Hebley, consulting engineer, Pittsburgh Coal Co., stressed the importance of conservation and stream purification and declared that research studies at West Virginia University and the Mellon Institute may provide the solution for acid mine drainage. Richard Maize, secretary, Pennsylvania Department of Mines, reviewed his state's mine sealing law (*Coal Age*, January, 1948, p. 130) and R. Dawson Hall, New York City, suggested that the answer to acid mine drainage might be in keeping air from mine water or in alkalizing water before it enters the mine. A. C. Fieldner, U. S. Bureau

MEETINGS

- Canadian Institute of Mining and Metallurgy: Golden Jubilee and annual meeting, week of Apr. 6, Vancouver, B. C., Can.
- Tenth Annual Midwest Power Conference, sponsored by Illinois Institute of Technology: Apr. 7-9, Sheraton Hotel, Chicago.
- American Mining Congress: annual coal convention, April 26-28, Netherland Plaza Hotel, Cincinnati, Ohio.
- Sixth Annual Anthracite Conference at Lehigh University: May 6-7, Bethlehem, Pa.

of Mines, commented on the beneficial effects of acid water in reducing sewage wastes and H. J. Rose, vice president, B.C.R., cited the need for research in all aspects of the problem.

The size of reliable samples for float-and-sink tests was treated in a paper by A. L. Bailey and B. A. Landry, Battelle Memorial Institute. After a detailed description of splitting, piling and riffling procedures, the authors evolved graphs for determining the degree of mixing required to reduce gross samples for any required degree of accuracy. Thomas Fraser, U. S. Bureau of Mines, stressed the value of this information in cutting the costs of sampling and making more practicable the frequent sampling of coal throughout a mine.

"Determination of Petrographic Components of Coal by Examination of Thin Sections," a paper prepared by B. C. Parks and H. J. O'Donnell, U. S. Bureau of Mines, established the fact that differences in microscopic magnification of thin cross-sections of coal make little difference in the accuracy of measuring opaque and translucent components. In other words, fewer samples from a coal column accurately establish the suitability of coal for liquefaction and hydrogenation.

A pelletizing process for utilization of coal silt was discussed in a paper by R. J. Day and C. C. Wright, Pennsylvania State College, at the Wednesday afternoon session. Discussing the design of the machine, the size consist of input material and the maximum packing needed, Dr. Wright, who read the paper, drew the following conclusions: (1) an input moisture content of 15 to 20 percent gives best results; (2) strength of finished pellets increases as moisture drops below 8 percent; (3) waterproofing can be provided by low-temperature carbonization or by tar or wax emulsions, etc.; (4) pellets burn faster than comparable sizes of coal and offer less resistance to gas flow; and (5) pellets have several advantages over coal in gasification.

Discussion of Dr. Wright's paper brought out the following comments, among others: (1) wettability and ash content of various coals appear to be factors in successful pelletization; (2) extrusion at low moisture makes better pellets but uses more power; (3) asphalt binders can be used for waterproofing; and (4) price of pellets is comparable to similar sizes of coal but if sold as a specialty fuel, pellets may command a premium price.

In a paper on "The Pittsburgh Seam in Northern West Virginia," S. D. Brady, consulting engineer, and W. D. Steele, preparation manager, Consolidation Coal Co. (W. Va.), surveyed the economic importance of the seam, its reserves and characteristics, selective mining and other practices and cleaning facilities in the region. Mr. Brady, who read the paper, pointed out that 98 percent of the reserve tonnage is good industrial steam coal and that the remaining 2 percent—some 100,000,000 tons—is of metallurgical grade containing 1.3 percent or less of sulfur.

Urging an up-to-date survey of the nation's coal resources, Andrew B. Crichton, mining engineer, Johnstown, Pa., stressed the perils of overestimating reserves and warned that, according to data available to him, the nation's coal possibly does not exceed 223 billion tons and may not last more than 250 years at present production rates and mining losses. In the industrial East, Mr. Crichton estimated only 74 billion tons, or 90 years' supply. The speaker also touched on the economic problems created by these short-term reserves, the possible use of lignite and low-rank coals, conversion of coal and lignite to gas and oil and the remoteness of Western reserves from great industrial centers.

H. M. Bannerman, U. S. Geological Survey, commenting on Mr. Crichton's address, agreed that published data on coal reserves are perhaps too high but suggested that Mr. Crichton had overstated the seriousness of the situation. Mr. Bannerman, admitting that new surveys are needed, stated that detailed mapping now is going on in at least eight areas. From now on, he declared, mining will be more difficult and coal will be of poorer quality. A. C. Fieldner, U. S. Bureau of Mines, added that conservation now is not so much a question of exhaustion of resources as of the increasing cost of mining.

Papers presented at the Grouting Symposium Wednesday morning and afternoon, included: "Introduction—Grouting in Mines," by F. C. Sturges, vice president, Pennsylvania Drilling Co.; "Grouting in the Southeast Missouri District," by W. Wagill, St. Joseph Lead Co.; "Use and Technique of Pressure Grouting in the Construction Industry," by V. L. Minear, chief's office, U. S. Engineers; "Use and Technique of Pressure Cementing in the Oil and Gas Industry," by Wm. D. Owsley and R. E. Moeller, Halliburton Oil Well Cementing Co.; "An Example of Controlled Pre-

(*Continued on p.* 153)

Personal Notes

Harry Swihart, general superintendent, Simpson Creek Collieries Co., Galloway, W. Va., has been named vice president in charge of operations for the company.

F. V. Hicks, formerly superintendent of the company's Geneva Coal mine, has been named general superintendent of mines for the Geneva Steel Co., Geneva, Utah.

Guy B. Darst has been elected president, Peerless Darby Coal Co., Splint, Ky. Mr. Darst, who has his offices at St. Charles, Va., will continue as vice president, Benedict Coal Corp.

Several personnel changes have been announced by Charles W. Connor, manager, Mining Division, American Rolling Mill Co., Montcoal, W. Va. **J. S. Chapman,** formerly personal relations advisor, has been appointed assistant to the manager. **C. O. Kane,** superintendent, Nellis mine, has been named production supervisor of all mines in the division, with offices at Montcoal. **James F. Trusley,** formerly general mine foreman, Montcoal Nos. 1, 5 and 6 mines, has been appointed to succeed Mr. Kane at Nellis mine. Mr. Trusley is succeeded as general mine foreman by **D. A. Mooney,** formerly general mine foreman, Nellis mine. **G. W. Glendenin,** assistant general foreman at Montcoal Nos. 1, 5 and 6, has become general mine foreman at Nellis. **Homer E. Webb,** assistant foreman at Montcoal No. 1, has been made assistant general mine foreman for Montcoal Nos. 1, 5 and 6.

D. T. Sorrent has resigned as preparation foreman, Mine No. 23, Island Creek Coal Co., to become a partner in the Paint Creek Coal Co., which operates a mine near Peach Creek. Other partners are L. F. Derenge, former Island Creek superintendent, and C. J. Stevens. Mr. Sorrent had been associated with Island Creek since 1930 in various supervisory positions.

Dr. Ralph L. Brown has been appointed chief, Coal Branch, Fuels and Explosives Division, U. S. Bureau of Mines, succeeding Dr. Louis C. McCabe, who resigned last September to become anti-smog administrator in Los Angeles. Dr. Brown has had long experience in coal and other research work in industry and for the government and for the past year has been assistant chief of the coal branch at the Central Experiment Station in Pittsburgh, Pa.

B. F. Reed, vice president of the Black Star Coal Corp., Pioneer Coal Co. and the Beaver Dam Coal Co., Louisville, Ky., has been elected executive vice president of the companies. Mr. Reed has been associated with the companies for 42 years, the last ten years as vice president.

J. B. Morrow, president of the Pittsburgh Coal Co. since November, 1938, has been named chairman of the board of directors for the company. **G. A. Shoemaker,** formerly vice president, operations, has succeeded Mr. Morrow as president. **Henry C. Rose,** formerly production manager, has been named vice president, operations.

James M. Cook, vice president in charge of operations, Imperial Coal Corp., Johnstown, Pa., has retired. Mr. Cook had been associated with Imperial for more than 30 years, the last 20 years as vice president in charge of operations.

Grover Robertson, at one time associated with Winding Gulf Collieries Co., Bluefield, W. Va., and more re-

And Another Actual Test taken by Coal Inspectors on a Chance Process Installation

United Engineers & Constructors Inc.

GAY MINING CO.

DAILY WASHING REPORT

Tipple Copy

WEST VIRGINIA COAL & COKE CORPORATION

CHANCE CONE #19 COAL • DAILY WASHING REPORT

Date 1-27, 1948 Washing Gravity 1.55

Plant DORRANCE COLLIERY Shift FIRST Location STIRRAT, W. VA. Sand 50 P2

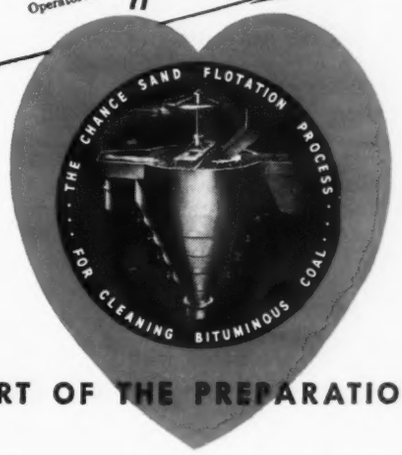
Time	Class.	Gravity Valve Setting No. 1	No. 2	No. 3	No. 4	Ammeter Reading Sand Pump	Agit.	Cir. Pump Gauge	Trap Cycle	Sand Used Lbs.	Wt. % Sinks in Cleaned Coal at Washing Gravity Size	%	Size	%	Size	%	Wt. % Floats in Refuse at Washing Gravity Size	%
7.30 AM	2.0	2.0	4.0	2.0	1.5	S1	4-to-6	12		400	3/32"x1/4"	.80	1/4"x3"	.20	3"x8"	.00	3/32"x8"	.10
8.30 "	"	"	"	"	"	"	"	"		400	"	.60	"	.20	"	.00	"	.20
9.30 "	"	"	"	"	"	"	"	"		400	"	.50	"	.30	"	.00	"	.30
10.30 "	"	"	"	"	"	"	"	"		400	1/4"x1"	.40	1"x3"	.20	3"x5"	.00	"	.10
11.30 "	"	"	"	"	"	"	"	"		400	2"x3"	.10	3"x5"	.00	5"x8"	.00	"	.20
12.30 PM	"	"	"	"	"	"	"	"		400	3/32"x1/4"	.60	1/4"x3"	.20	3"x8"	.00	"	.30
1.30 "	"	"	"	"	"	"	"	"		400	"	.40	"	.10	"	.10	"	.10
2.30 "	"	"								400	"	.50	"	.10	"	.00	"	.20
Avg.										400		.49		.16		.00		.19

Remarks: Average feed to cone 375 tons per hr.
Operated 7½ hours.
Sinks in cleaned coal—Near gravity bone.
Floats in refuse—Near gravity bone.
No delays.
1.18 lbs. sand used per ton of feed.

Plant Supt. Jack Shannon

Operator James Jordan

Another case of Chance high separating efficiency. Similar washing efficiencies are being maintained at many Chance equipped washeries, resulting in large savings to the users. Our engineers are available for study of your washing problems.



THE HEART OF THE PREPARATION PLANT

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NEW YORK 17 • PHILADELPHIA 5 • CHICAGO 2

MEN OF THE WINTON NO. 1 MINE (upper photo, No. 7½ seam; lower, No. 1 seam), who worked 600,652 man-hours without an injury.

Union Pacific Mine Sets New Safety Mark

A new high in coal-mine safety achievement, based on available records, was set in 1947 by the Winton mine of the Union Pacific Coal Co., according to I. N. Bayless, president. The mine worked 600,652 man-hours during the year without an injury. To celebrate the event, the coal company gave a party Jan. 24 at Rock Springs, Wyo., for the 280 miners of Winton mine.

In commenting on the accomplishment, Mr. Bayless pointed out that among the 160 bituminous coal mines entered in safety competition last year, the average was 22,179 man-hours per injury, and that the mine that won the National Safety Award in 1947 (based on 1946 performance) worked 79,737 man-hours without an injury. The records show the highest man-hour record without injury ever reached heretofore by any coal mine since safety competition originated in 1925 was 339,156 man-hours in 1936, Mr. Bayless said.

Other Union Pacific Mines had much higher man-hour records, but some injuries were sustained. The nearest any other of the company's mines came to the Winton record was the record of the Superior Mines District, with a total of 265,014 man-hours per injury, five injuries having been charged against the Superior District during 1947. The total for all Union Pacific Coal Mines in 1947, Mr. Bayless said, was 210,507 man-hours per injury.

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cently an operator in Lee County, has rejoined Winding Gulf as assistant manager.

W. C. Fancourt has been appointed chief engineer, Mine Sealing Division, Pennsylvania Department of Mines, with offices at Ebensburg. Mr. Fancourt was previously associated with the Berwind-White Coal Mining Co., Eastern Gas & Fuel Associates and the Bird Coal Co.

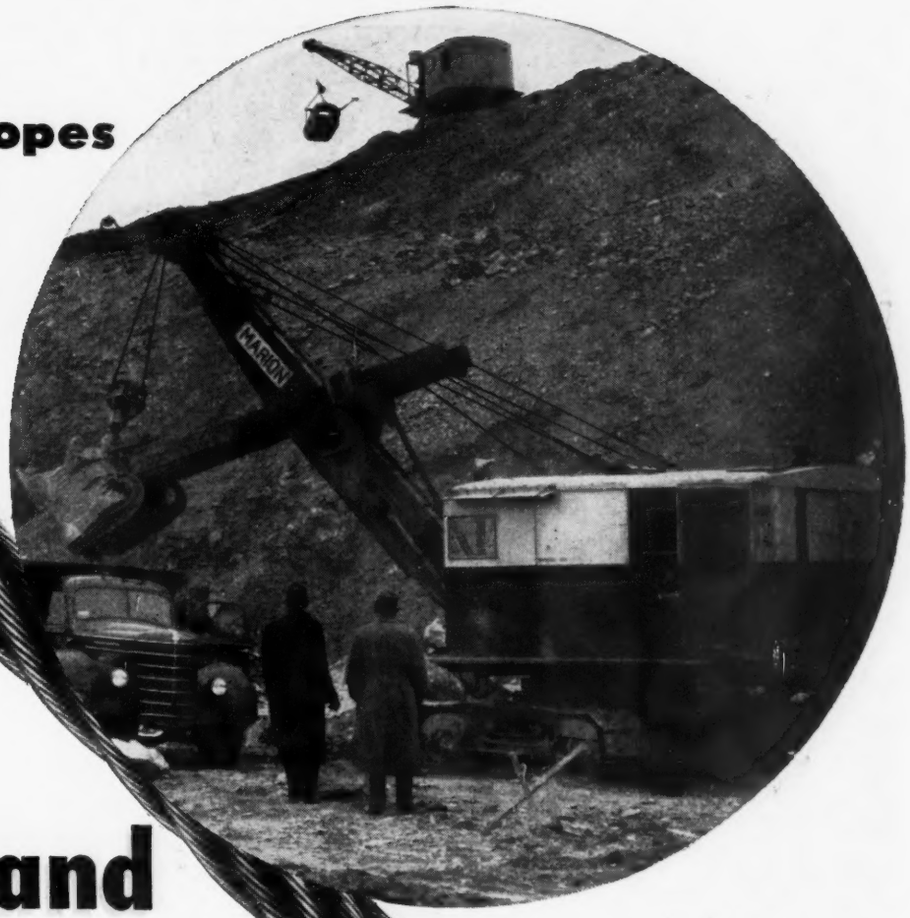
Louis Gaggini has resigned from the engineering department of the United States Fuel Co., Hiawatha, Utah, to join the Sheridan-Wyoming Coal Co., Inc., Monarch, Wyo., as chief engineer.

Preston H. Haskell Jr., associated with the Alabama By-Products Corp. since 1923, has resigned as vice president in charge of coal mine operations to become president of the Southern Minerals Co., Birmingham, operators of strip mines in Northern Alabama.

Walter C. Shank, president, Crowe Coal Co., Kansas City, Mo., has been elected a director and member of the finance committee of the Wabash R.R. Co. Mr. Shank also is chairman of the board of the Inter-State National Bank, a director of Stauffer Publications, Inc., Hotel President Co., and Inter-State Cattle Loan & Oil Co., all of Kansas City.

Several promotions among its engineering staff have been announced by the Coal Division, Eastern Gas & Fuel Associates. **J. M. Baker**, plant engineer at Sonman since 1939, has been named project and planning engineer in Pittsburgh, succeeding E. B. Taylor, new superintendent of the Maitland mine. **Van Gregory**, formerly engineer at Powellton No. 3 and more recently construction engineer in the Powellton Division office, has been appointed engineer to assist in the property, mining and mechanical department in Pittsburgh. **William Laird**, previously plant engineer at Wharton, had become plant engineer at Sonman. He is succeeded at Wharton by **Frank W. Riddle**, formerly draftsman at Kopperston. **W. W. Mabe**, transitman at Eccles, has been made draftsman at Kopperston.

men who know the ropes



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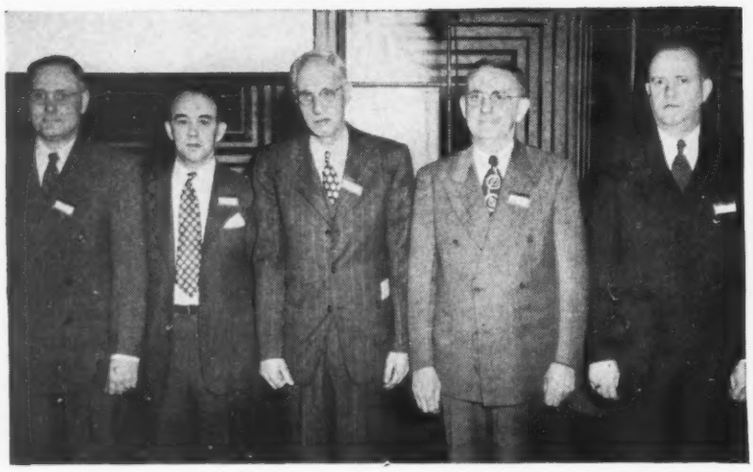


POWER DISTRIBUTION in the Mining and Glass Industries session, Thursday morning (left photo)—R. T. Woodruff (left), Aluminum Ore Co., chairman; James P. E. Arberry, Pittsburgh Plate Glass Co.; Albert Brown, Philadelphia & Reading Coal & Iron Co.; Donald J. Baker and M. W. Pennybacker, I-T-E Circuit Breaker Co. AT RIGHT: GENERAL APPLICATIONS to Mining session, Friday morning—A. C. Muir (left), Berwind-White Coal Mining Co., chairman; W. R. Morton, General Electric Co.; C. O. Wood, Goodman Mfg. Co.; and D. E. Renshaw, Westinghouse Electric Corp.

ELECTRIC CABLES in Mines session, Friday afternoon—E. W. Davis (left), Simplex Wire & Cable Co., chairman; C. C. Conway, The Consolidated Coal Co.; Robert C. Graham, Rome Cable Corp.; C. B. Peck Jr., Anaconda Wire & Cable Co.; G. J. Crowdes, Simplex Wire & Cable Co; E. J. Gleim, U. S. Bureau of Mines; and Frank R. Hugus, Joy Mfg. Co.

Mining Electrical Problems Topics at A.I.E.E. Sessions

ELECTRICAL PROBLEMS in the distribution of power, general applications of mining equipment and mining cables were among the subjects discussed at the winter meeting of the American Institute of Electrical Engineers, held in the William Penn Hotel, Pittsburgh, Pa., Jan. 26-30. The mining papers were presented under the auspices of the Mining and Metal Industry Committee. Total registration for the week-long meeting was 3,011.

Power topics vital to both deep and strip mines were discussed at the Thursday morning session. Phase-to-phase ground faults on low-voltage delta-connected a.c. systems were described by James P. E. Arberry, electrical engineer, Pittsburgh Plate Glass Co. Mining companies with delta systems often experience such costly power disturbances. Here, the second ground, completing a phase-to-phase ground fault, is often responsible for two widely separated cable failures on a distribution system. To overcome the trouble by limiting the failure to one circuit or piece of equipment, the glass company replaced the delta-connected supply with a three-phase three-wire grounded neutral supply. With the new arrangement, it is believed that minor grounds will be isolated by the blowing of a fuse or a similar protective device. When major grounds occur, such as on a feeder cable, the feeder circuit breaker will trip and remove the ground from the system.

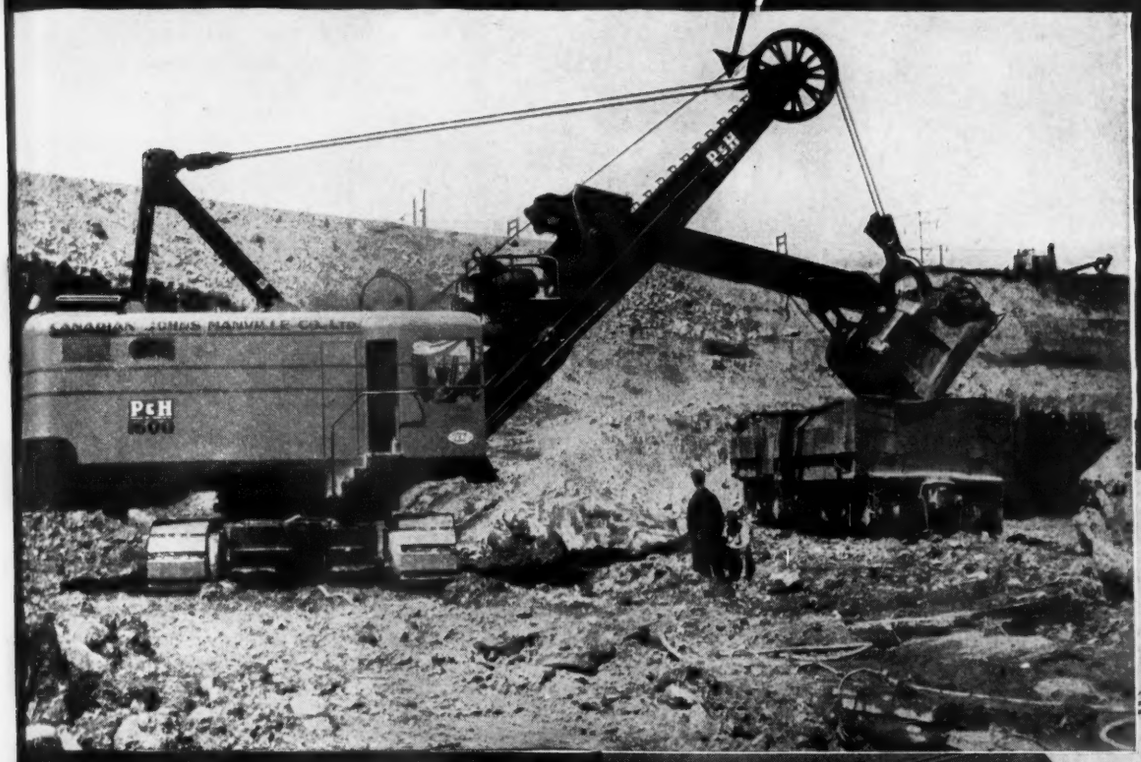
Strip mining accounted for approximately 25 percent of the 1946 anthracite production, said Albert Brown, electrical engineer, The Philadelphia & Reading Coal & Iron Co., in his paper on "Power Supply for Strip Mining." To illustrate the size of one large operation, Mr. Brown cited the following figures from one now in its seventh year. The original estimate called for the removal of 18,515,000 cu.yd. of overburden. To date, 21,890,000 cu.yd. of material, including 10,650,000 cu.yd. of solid yardage and 11,240,000 cu.yd. of recast yardage, have been handled. So far, 2,376,000 gross raw tons of coal of an estimated 5,100,000 tons have been recovered.

Another strip mine recently started will require the removal of approximately 70,000,000 cu.yd. of overburden to uncover an estimated 12,000,000 gross raw tons of coal. The probable life of this operation will be 12 to 15 years.

Combinations of various shovel sizes, drill rigs and miscellaneous equipment, said Mr. Brown, produce a wide range of connected loads, such as 240; 630; 680; 1,035; 1,230; 1,740 and 3,800 hp. At one major operation a connected load of 3,785 hp. consisted of the following units: 25-yd. walking dragline, 1,750 hp.; 15-yd. walking dragline, 650 hp.; two 5-yd. shovels, 275 hp. each; 4-yd. dragline, 275 hp.; eight drill rigs, 40 hp. each; machine-shop load, 120 hp.; and cleaner plant load, 120 hp.

Peak loads of 2,500 kw. are registered by the 1,750-hp. dragline. However, the diversity factor is such that the average 15-minute intergrated demand at this operation is about 1,640 kw., with a primary power factor of 93 percent. A 1,250-hp. 0.8-p.f. synchronous motor on the 25-yd. dragline

From EAST to WEST



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EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in January, as follows:

Baker-Raulang Co.—Types SB and SC hydraulic timbering machines; two 5-hp. motors, for travel and pump, 48 volts, battery operated; Approval No. 2-603; Jan. 5.

Joy Mfg. Co.—Type 5SC-7PD storage-battery shuttle car; three 5-hp. motors, 90 volts, d.c.; Approval No. 2-604; Jan. 6.

Ensign Electric & Mfg. Co.—Ensign pump; one 3-hp. motor, either 230 or 500 volts, d.c.; Approvals Nos. 2-605 and 2-605A, respectively; Jan. 21.

Farmers Engineering & Mfg. Co.—"Femco" battery-condenser-type 10-shot blasting unit; Approval No. 1603; Jan. 23.

Fidelity Electric Co., Inc.—Fidelity generator-type 10-shot blasting unit; Approval No. 1604; Jan. 23.

and a 650-hp. 0.8-p.f. synchronous motor on the 15-yd. unit maintain this high power factor. Ward-Leonard, Amplidyne and Rotatrol control schemes also are used.

The outdoor substations are supplied from 66- or 22-kv. public utility transmission lines. Transformer capacities range from 450 to 3,000 kva. One killovolt-ampere of transformer capacity for each horsepower of connected load is good practice, said Mr. Brown. The low voltage equipment consists of lightning arresters, disconnecting switches and outdoor-type 7,500-volt 50,000-kva. oil circuit breakers, with three current-trip coils operated from bushing-type current transformers. The advent of large equipment, such as the 1,750 hp. draglines, has resulted in the use of 3,000-kva. master-unit-type substations, with two outgoing feeders on the low-voltage side. There are five such substations in the Western, Middle and Southern anthracite fields, each supplying power for large draglines and other stripping equipment.

Distribution voltage is either 2,400 (for a three-wire sysem) or 4,160 (for a four-wire system), the latter being favored for the larger equipment. Portable switch houses with circuit breakers, phase- and ground-protecting relays are rapidly coming into use, said Mr. Brown. Their location at take-offs is particularly desirable as they help localize trouble and eliminate delays. The 4,160-volt system is desirable, both because of increased capacity and safety. It is safer because ground faults can be cleared rapidly.

The ground wire is carried from the equipment through the portable cables and the overhead pole lines to the neutral of the Y-connected secondaries of the transformer. A 50-amp. current-limiting resistor and a 50/15-amp.

16-CAR TRIP *Dumped* in 80 seconds!

Inside the mine, the loaders can't be kept waiting...every second counts—and *costs!*

Automatically unloaded without stopping, this whole trip of ACF Drop-Bottom-Mine Cars is ready to start back to the mine in just one minute and twenty seconds! "Lubricated" doors unlatch, dump, and latch, automatically, in motion ...unload a 5-ton car every five seconds! No wonder ACF Drop Bottom Cars up coal output...Our Sales Representatives will be glad to show you how a change-over to ACF Mine Cars will raise production and lower costs in your mine.

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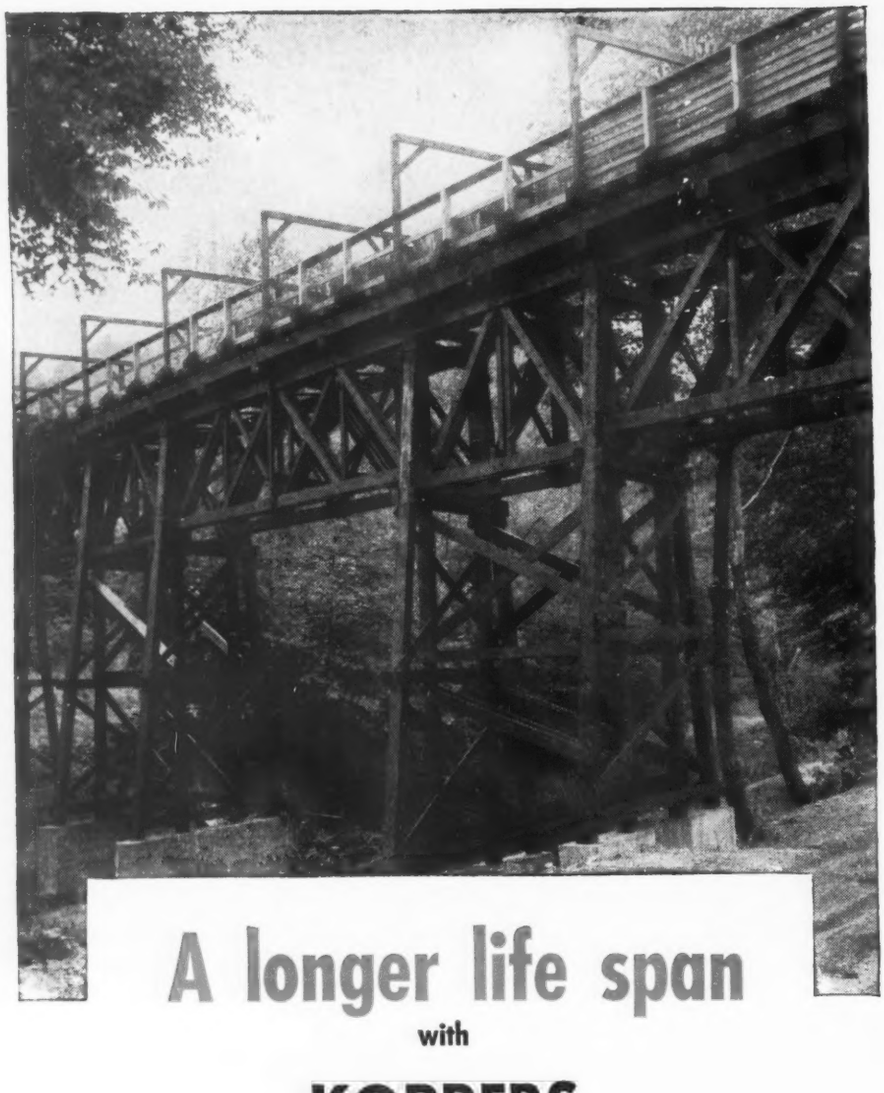

A longer life span

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KOPPERS PRESSURE-CREOSOTED WOOD

Here's a trestle that's paying dividends in longer service, lower maintenance, greater safety. Why? Because it's built of Koppers Pressure-creosoted wood!

Koppers Pressure-creosote treatment fortifies bridge members against the decay that's responsible for most so-called "mechanical" failures and most repair jobs. No painting required for protection. Where desired, all members can be preframed to customer's blueprint, treated and shipped to job for assembly. Repair materials and labor costs are rising all the time . . . and the profit-possibilities of enduring construction are more inviting than ever before. In your next trestle, save time, trouble and dollars by using Koppers Pressure-creosoted wood.

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KOPPERS COMPANY, INCORPORATED

PITTSBURGH 19, PENNSYLVANIA

outdoor-type current transformer is installed between the transformer neutral and the ground wire from the pole line. In the case of the unit-type substations, the secondaries of these current transformers are connected to ground-fault relays. The slightest ground fault causes the ground-fault relays to function and trip the breaker. Phase-to-phase faults are cleared by phase-overcurrent relays.

Type SH-D three-conductor shielded cables with ground wires and 5,000-volt heat-resisting i..sulation are used on the 4,160-volt shovel service. Cable sizes vary from No. 4/0 to 4. Three-conductor 600-volt types "W" an l "G" cables are used for the 440-volt service to drill rigs and welders.

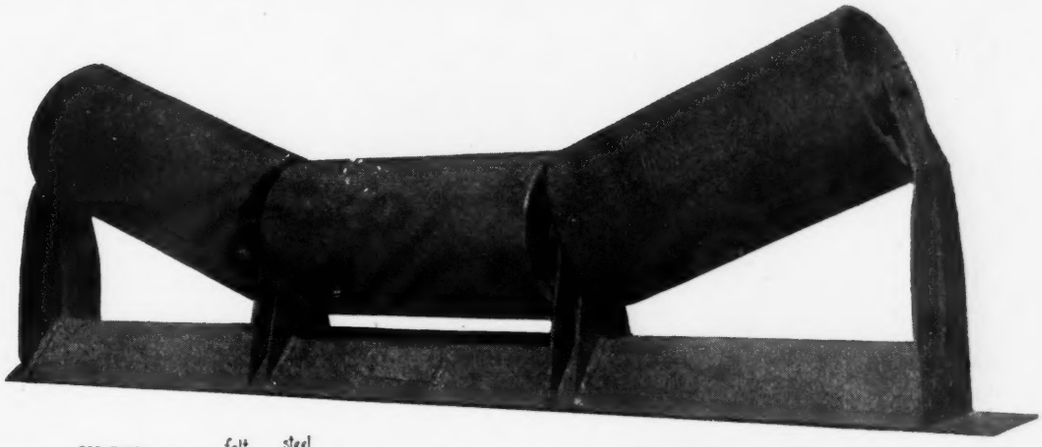
Of 27 strip mines operated by P. & R., 15 are electrified and receive power from transformer substations which it owns. Two other operations are served from existing colliery transformer stations. Of this number, five are 3,000 kva. 66/4.16-kv. unit-type substations, with two outgoing 4,160-volt feeders. At present, four 1,750-hp. draglines are in service. The average total 15-minute integrated demand for the over-all stripping load is 8,200 kw. The average monthly consumption is approximately 2,850,-000 kw.-hr.

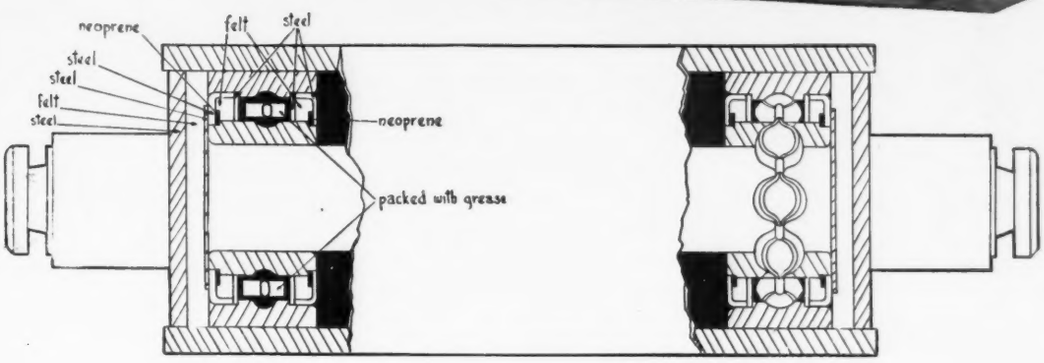
C. L. Sarf, Hanna Coal Co., in discussing Mr. Brown's paper, said they used a factor of 0.75 kva. per horsepower of connected load in figuring transformer capacities. Demand swings of 6,300 hp. on a 3,000-kva. transformer station, or 0.48 kva. per connected horsepower, have been recorded. However, the transformers were equipped with fans. The load factor runs about 55 or 60 percent, and he does not think that it would ever go about 70 percent. High power-factor compensates for the voltage drop expected on long pole line circuits, he said.

In predicting higher voltages for strip mines, David Stoetzel Jr., mining division, General Electric Co., said the next logical step would be to go from 4,160 to 6,600 volts. He said that for a nominal cost a three-phase delta-connected 2,400-volt system could be provided with the same fault-clearing characteristics as the four-wire Y-connected 4,160-volt system. A zig-zag type transformer must be added to establish a neutral to which the grounding resistor can be tied.

The disregard of overcurrent protection on new circuits was one of the primary errors made in expanding mine d.c. distribution systems in the past, said M. W. Pennybacker and Donald J. Baker, I-T-E Circuit Breaker Co., in a paper entitled "The New D. C. Sectionalization Application Standards." In the rush of installing additional substations, the distribution system was viewed as one large positive and negative return circuit. Actually, it is a number of individual remotely located substations operating in parallel, and whose multiple

KREMSER'S NEWEST and BEST IDLER





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THE NEW KREMSER IDLER IS SUPERIOR

After years of research we are proud to present the new and improved pre-greased bearing with its new seal . . . found only in Kremser's Idler. It is especially recommended for coal mines or any other place where dust, water, or any other serious, hazardous conditions prevail.

The bearing is protected by seven outside seals and four inside seals. An Idler on test in our plant for a month has been running completely submerged in water contaminated with foreign elements, and has not shown the least wear whatsoever.

The bearing itself is pre-greased with lubrication grease in the center, and water repellent grease on the outside, with no maintenance necessary.

Any Idler is only as good as its bearing, and any bearing is only as good as its seals. It has been our successful endeavor, through a long period of research, to find a bearing that would not cost too much, and yet answer the above requirements. We believe we have finally arrived at a bearing that will give the utmost service at minimum cost.

We invite your inquiries for full details. Write us today.

We Manufacture Complete Belt Conveyors, Including Belt and Drives.

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Shorts, overloads and other faults in your mine electrical distribution system can cause costly damage to machinery and tumble your production schedule. That's why you should sectionalize your trolley and feeder circuits with I-T-E Type KSC Automatic Reclosing Circuit Breakers.

When a fault occurs, the KSC automatically opens, and recloses only when the fault has been corrected. It isolates the affected area to prevent interruption of production in other areas. This cuts lost time to a minimum—contributes to higher production.

As shown in the diagram above, a disconnect switch or protective device should be placed in every power line at not over 1500 foot intervals. An overcurrent protective device should be used in each circuit leaving a substation. These can be fuses or circuit breakers of the manual or the automatic reclosing type. (If circuit breakers are employed, trip free operating mechanism should be used.) The exception to this is where a substation feeds the main haulage only and only one haulage unit at one time. In this case only one breaker is required at the station.

There are other important applications—too numerous to mention here. Full details can be obtained by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your electrical distribution system. So use him—at no obligation.

Be Wise SECTIONALIZE

I-T-E Circuit Breaker Company

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PA.

(2ND OF A SERIES ON RECOMMENDED SECTIONALIZING PRACTICE USING THE KSC)

I-T-E SECTIONALIZING Switchgear

circuits will assist each other only when faults are not present.

Because most mine fires are caused by roof falls bringing down trolley wires and feeder cables, or by damaged machine cables, the Bureau of Mines some time ago urged the industry to study the problem and make recommendations to reduce such hazards.

The operators, it was stated, contributed more than any other group in the committee to the recognition of the dangers in a solidly-connected distribution system, and the measures that should be taken to reduce the hazards. The fact that some of the best companies in the industry have already brought their distribution systems up to the new standards is convincing evidence of the trend toward safer practices before codes are prepared for enforcement. The complete list of eleven recommendations, together with wiring diagrams, may be found on p. 103, *Coal Age*, February, 1948.

Synchronous converters, m.g. sets and power rectifiers are the three commonly accepted types of power conversion sets in mines said W. P. Morton at the Thursday morning session in a paper on "Conversion Equipment for Mine Power." While the paper described all three units, more space was devoted to a detailed description of the power rectifier—the newcomer to the field, and perhaps the least understood by mining company personnel.

Voltage regulation is of particular significance since most mines are fed from transmission lines that are subject to considerable voltage fluctuation. The d.c. voltage of the synchronous converter and the power rectifier, he said, is dependent upon the voltage of the a.c. supply, while the voltage of the m.g. set is independent of the a.c. voltage. On systems with wide fluctuations in a.c. voltage, the m.g. set had a distinct advantage.

More space is made available in some types of mining machines by utilizing the motor frame as the machine frame, said D. E. Renshaw, Westinghouse Electric Corp., in a paper entitled "D.C. Motors and Controls for Underground Coal Mining Machines." Since the space ordinarily used for the machine-frame structure is occupied by the magnetic frame of the motor, the motor can be made larger without increasing the dimensions of the machine.

Most mining-machine motors, said Mr. Renshaw, are compound wound, with a relatively heavy series field and only enough shunt field to stabilize the light-load speed of the motor. A compound-wound motor has a desirable self-load-limiting characteristic because it loses speed with increasing torque, thus minimizing the current drawn from the line and correspondingly reducing motor heating.

The reduction of machine speed and the overheating of motors due to low

New INTERNATIONAL Giant Diesel Crawler

To Speed Up Strip Mining

180-HORSEPOWER TD-24 PROVIDES NEW SPEED AND WORK CAPACITY

The most versatile power on crawler tracks! This great new tractor provides maximum work capacity through the combination of tremendous drive, matchless maneuverability, ease of operation and speed.

The TD-24 is designed for high speed operation despite its size and weight. Its International Diesel engine develops 180 horsepower at the flywheel, 167 horsepower at the driven end of a belt and 140 drawbar horsepower for operating earth-moving and other equipment.

Planet-Power Steering—for gradual turns with both tracks pulling and pivot turns with one track locked and full power on the other—and Finger-Tip Control make it easy to operate. Its synchromesh transmission permits on-the-go shifting. A separate forward-reverse shift lever permits quick reversal of direction in any traveling speed. Instant high-low range shift adds to its effectiveness in bulldozing.

These and other operating features make the TD-24 the outstanding tractor in the big crawler class for stripping overburden, moving pay or spoil, building access roads and numerous other important operations. Get the complete story on this new giant of power and performance from your International Industrial Power Distributor.

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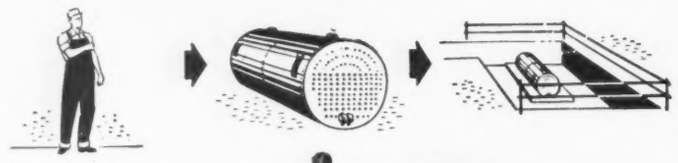
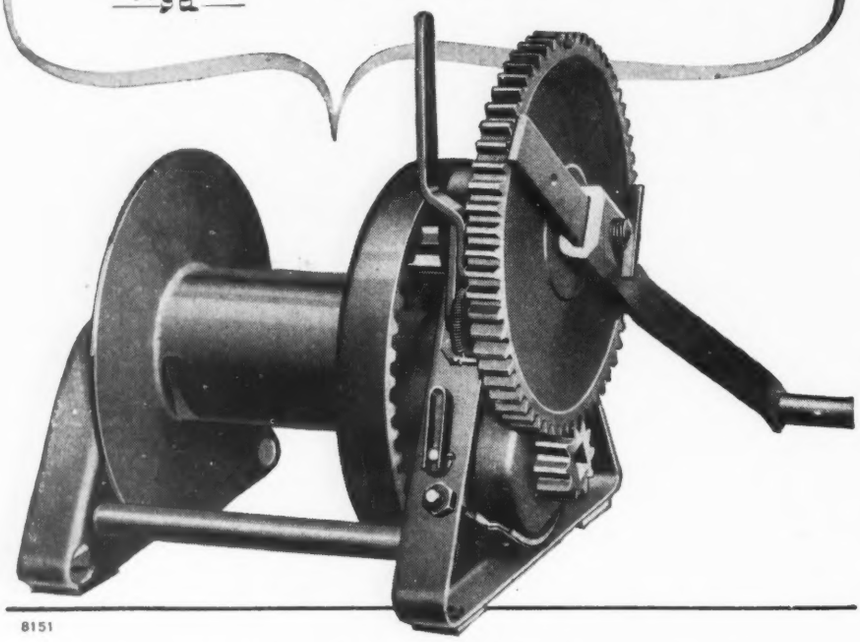
Would you believe . . .

that one man, with no power equipment . . .

can haul this heavy boiler . . .

out of this deep pit?





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Stoutest, most ingenious small winch ever built, HANDIWINCH and *one man* can handle any lifting or pulling job up to 10,000 lbs. All steel construction . . . cut gears . . . two power ratios . . . powerful hand brake . . . many "big hoist" features.

Ask your distributor . . . or write direct for folder HW-15, showing many typical HANDIWINCH set-ups.

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For Armored Construction . . . specify

AMERICAN BLOCKS AND SHEAVES

A wide line of wire rope blocks—many types, all sizes, in capacities from 1½ to 250 tons. Thick steel side plates, heavy pins and axles. Ask for American equipment when ordering.

For fastening wire rope, use genuine

CROSBY CLIPS

Hot dip galvanized—high wings—grooved saddle—precision cut threads. To make sure you get genuine CROSBY CLIPS, look for the famous Red U-Bolt. All sizes—⅛ to 3 inches. Distributors everywhere.

voltage are becoming better known to mine management, he said, and many conversion units and much feeder copper are being installed to minimize voltage drop and thus maintain more constant voltage at the machines.

The principal sources of control trouble are interlocking or auxiliary contacts, control resistors, main resistors, contactor coils and overload devices, but not necessarily in that order. Interlocks generally can and should be made non-adjustable, said Mr. Renshaw. An interlock which can be adjusted frequently will be adjusted wrongly, or unsuccessful attempts at adjustment will be made after the useful life of the part is finished. The number of interlocks should be kept to a minimum, he added.

Ventilation will rid the explosion-proof controllers, such as used on shuttle cars and locomotives, of harmful nitrous oxides. The air must be blown into and exhausted from the case through explosion-proof labyrinth fittings. Three or four changes of air per minute are necessary, but not enough air is to be admitted to support combustion if it contains enough methane to form a combustible mixture.

Fluctuating voltages, limited control space, high humidity and acid-laden air are the major handicaps to the solution of electrical control problems in coal mines, said C. O. Wood of the Goodman Mfg. Co. Fluctuating voltage is a serious problem with magnetic controls. The control equipment must operate continuously on 300 volts and also give satisfactory performance on 125 volts. This is accomplished by increasing the physical dimensions of the magnetic circuits and the operating coils. Low voltages demand liberal design, said Mr. Wood.

Drum-type controllers at present are largely being replaced by cam-actuated contactors. They are spring-closed and cam-opened. This eliminates any possibility of not being able to shut off the power.

Voltage gradients must be studied between various control units as well as within the units themselves to build the control panels into a confined space. Parts which always have low voltage between themselves may be placed relatively close together, while parts which, at times, may be widely different in voltage must be located farther apart.

Using two breathers in an explosion-proof compartment will provide adequate ventilation, said Mr. Wood. Forcing air into one and out the other will carry off the ozone and nitric-acid compounds. However, breathers must be cleaned occasionally to prevent clogging with dust.

Lengthening trailing-cable life was another feature of the Mining and Metal Industry Committee proceedings. Points brought out at this session are summarized in the article on p. 67 of this issue.

Annual Savings in Mine Haulage

In Mine Locomotives and Shuttle Cars
EDISON *Nickel-Iron-Alkaline Batteries Give You These Important Advantages*

- They are durable mechanically; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are foolproof electrically; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be charged rapidly; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They withstand temperature extremes; are free from freezing hazard; are easily ventilated for rapid cooling.
- They can stand idle indefinitely without injury, without attention, and without expense.
- They are simple and easy to maintain.

Consistently low cost of operation—per year—per mile—per ton! That's what your records show when EDISON Nickel-Iron-Alkaline Storage Batteries power your mine locomotives and shuttle cars. These rugged batteries stay on the job, out of the repair shop, because:

The cells are built of sturdy steel to withstand rough usage; they contain an alkaline electrolyte which is a preservative of steel; their foolproof electrochemical principle prevents chemical deterioration.

EDISON Batteries can be charged in only six or seven hours during off-peak periods without equalizing, using current direct from the d-c supply through relatively inexpensive resistors, for they do not require critical adjustment of charge rates.

Protect your tonnage schedules—use EDISON for economy, efficiency and dependability.

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- FASTER fire-stopping power is your first requirement when fire breaks out... and Ansul Dry Chemical Fire Extinguishers give you that extra margin of protection against major fire damage.
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- For fires in flammable liquids and in electrical equipment, Ansul Dry Chemical Fire Extinguishers provide greater protection... pound for pound and dollar for dollar than any other extinguisher.

Get the facts. Ask for authoritative comparative ratings as determined by a national approval agency.

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ANSUL CHEMICAL COMPANY
FIRE EXTINGUISHER DIVISION, MARINETTE, WISCONSIN

Obituary

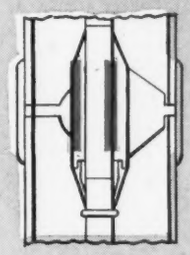
Thomas Moses, 78, Illinois Director of Mines and Minerals, died Feb. 20 at the St. Elizabeth hospital, Danville, Ill., following a two-months illness. Mr. Moses, who had entered the mines at the age of eleven, had had a long and distinguished career in the coal mining industry. Following some years as a miner and a state mine inspector, he was named superintendent of the Westville, Ill., operations of the U. S. Fuel Co. in 1910, becoming general superintendent five years later. In 1927 he was named president of the H. C. Frick Coke Co., U. S. Coal & Coke Co. and other U. S. Steel subsidiaries. From Jan. 2, 1938, until his retirement, Aug. 18, 1939, he was vice president in charge of raw materials for the U. S. Steel Corp. He returned from retirement last October to accept the state post.

John J. Lincoln, 82, widely known throughout the industry and one of the pioneer coal operators of the Pocahontas field of Southern West Virginia since the Nineties, died Jan. 23 at his home in Elkhorn, W. Va. While his death was unexpected, he had been in ill health for sometime. At the time of his death, Mr. Lincoln was vice president of the Crozer Coal & Land Co. and the Page Coal & Coke Co., chairman of the board of the American Coal Co. of Allegany County, and chairman of the executive committee of the Pocahontas Coal Operators' Association. He was one of the founders of the association in 1902, serving as its secretary from that year until 1918. He also served as treasurer and was president from 1932 to 1945, when he became chairman of the executive committee.

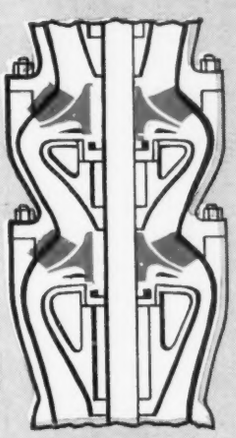
E. P. Lucas, president, Bellingham Coal Mines, Seattle, Wash., died Jan. 19 in California. Mr. Lucas had been active in the Washington coal industry for more than 30 years.

T. G. Rogers, 50, president and gen-

EASY ADJUSTABILITY. With one simple "at the surface" adjustment, you can vary capacities over a wide range without power-wasting "throttling." Adjustment nut can also be used to compensate for wear . . . assuring new pump efficiency *for the lifetime of the pump!*



QUIET, SMOOTH OPERATION. Pomona's revolvable rubber shaft bearings assure vibration-free shaft support under all conditions.



FREEDOM FROM SAND-LOCKING. You won't have any costly stoppages with Pomona. Open impeller design assures complete freedom from sand-locking . . . minimizes wear . . . eliminates the need for sealing or wearing rings.

WATER LUBRICATION. Pomona's *true* water lubrication is your guarantee of clean, clear water. Water lubrication also means simplicity of design with fewer working parts for maximum dependability, lower operating costs, less maintenance.

It isn't just chance that Pomona gives you all the features you've always wanted in a vertical turbine pump. Lowest-cost-per-gallon service . . . unequalled dependability . . . simplicity of installation and maintenance, these are "designed-in" features resulting from years of experience. Just check these features. You'll find what you want!

WHAT YOU WANT IN A PUMP YOU GET WITH POMONA!

CHECK THESE and other "wanted" Pomona features with your Fairbanks-Morse Pomona dealer or branch pump engineer. They can show you how the Pomona line . . . sizes from 4 to 36 inches, capacities from 15 to 20,000 G.P.M. . . . gives you more!

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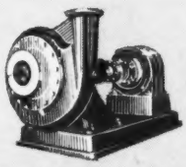
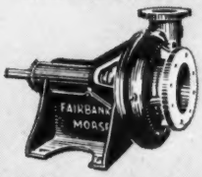
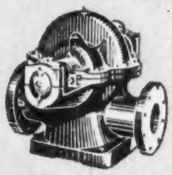


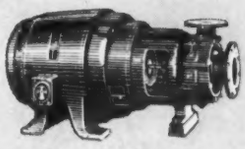
Trash Pumps



Side-Suction



Centrifugals



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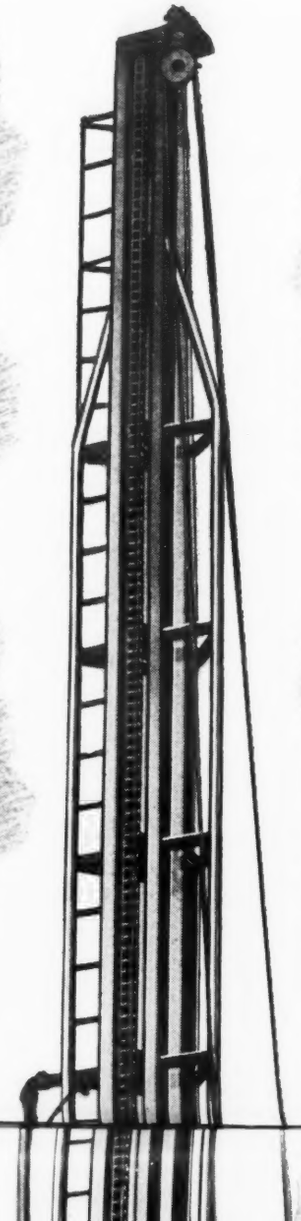

Here's the drill for open cut work that mining and quarrying men have wanted for years. A drill with vastly superior drilling speed . . . A drill that has continuous hole cleaning, that collars a hole with ease, requires no water, has automatic rotation, is easily maneuverable and quickly set up. The QUARRYMASTER is a completely self-contained unit. It includes an air-powered drill, a compressor plant, propulsion equipment and auxiliaries.

Ingersoll-Rand presents the QUARRYMASTER as the greatest advance in rock drilling for open pit mining and quarrying since the days of hand drilling.

The overall efficiency of the QUARRYMASTER results in a new low in drilling costs. Now operators can afford to space holes more closely, permitting proper distribution of powder. The result is better fragmentation and a minimum of secondary blasting.

Designed and built by Ingersoll-Rand, the world's largest makers of Rock Drilling Equipment, the QUARRYMASTER is the result of 75 years experience with rock drills.

Here are but a few of the outstanding features found in this revolutionary machine:

CONTROLLED FEED permits a fine degree of regulation that is necessary in drilling ravelly and fitchery ground. The throttle of the Ingersoll-Rand air-operated feed motor is within easy reach of the operator.

EASY COLLARING is assured by a time-saving drill steel centralizer. It guides and supports the steel in the most uneven ground until the hole is well started.

RAPID SPOTTING will save many hours of valuable drilling time. The quick acting crawlers are powered by independent Ingersoll-Rand Air Motors. These motors are extremely sensitive to control and permit inching or spotting of the machine to exactly the position desired.

QUICK SET-UPS allow more time to be spent in drilling. This unit is equipped with four independently controlled hydraulic jacks that save up to 20% of the usual set-up time. Additional set-up time is saved because perfect levelling is not required. Holes drilled with the INGERSOLL-RAND QUARRYMASTER do not have to be vertical.

LONG WEARING BITS that are light-weight and quickly changed is another important cost-saving feature.

PROVEN POWER PLANT...The power plant which is an integral part of this unit is the Ingersoll-Rand MOBIL-AIR KA500 Portable Compressor which has been used with such great success by thousands of contractors throughout the world.

1 POWERED DRILLING

❶ POWERED DRILLING . . .

Powered drilling guarantees maximum efficiency. The air-operated piston drill striking more than 200 powerful blows per minute insures the highest rate of rock penetration. A patented Ingersoll-Rand valve and power cycle is responsible for its snappy action.

❷ AUTOMATIC ROTATION . . .

Automatic rotation turns the bit progressively to a fresh-cutting position with each blow. This powerful and proven Ingersoll-Rand controlled rotation insures effective cutting and is invaluable in ground that tends to stick a steel.

❸ CONTINUOUS HOLE CLEANING . . .

Continuous hole cleaning eliminates bailing. It also saves power that is otherwise wasted in drilling through previous cuttings. The cuttings are removed from the hole by compressed air which passes down through the hollow drill steel. When the cuttings reach the surface they are caught by an efficient dust collector.

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Operation speeds of many production machines have reached an all time high. Speeds above 25,000 R.P.M. are common today. There are LUBRIPLATE lubricants especially well adapted for high speed use. They reduce friction to a minimum, arrest progressive wear and protect against rust and corrosion. There is a LUBRIPLATE lubricant for every need regardless of operating conditions. Write for particulars.

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Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

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Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

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eral manager, Bevier Lamb Mining Co., Bevier, Ky., was killed Jan. 29, when the car he was driving collided with a truck near Nonnell, Ky.

Anthracite Companies Lauded for Safety Work

The Jermyn-Green Coal Co. and the Kehoe-Berge Coal Co., both of Pittston, Pa., were honored during January by the Pennsylvania Department of Mines for their outstanding safety records during 1947.

A dinner to honor its 38 foremen and assistants and other officials of the company was given in Pittston by Jermyn-Green and was attended by state and union officials and others. In speaking at the dinner, Joseph J. Walsh, Deputy Secretary of Mines, said the company's record had "beaten all the so-called line companies, the combined independent companies and all of the twenty-odd bituminous producing states of the nation." Richard Maize, Secretary of Mines, in expressing his regrets that he could not attend the dinner, wrote Kenneth A. Lambert, general manager of the company, offering his congratulations.

During 1947, there was only one fatality in 2,747,647 man-hours worked at the Butler, No. 6 and No. 14 collieries of the company. The last fatality at No. 14 colliery occurred in November, 1945, and there has been none at Butler since Jan. 5, 1940. Among company officials attending the dinner were: Mr. Lambert, Douglas Green, vice president; Thomas Maloney, treasurer; William Campbell, superintendent, Butler colliery; Stephen Nemshick, safety engineer, and R. D. Sheperd, superintendent, No. 14 colliery.

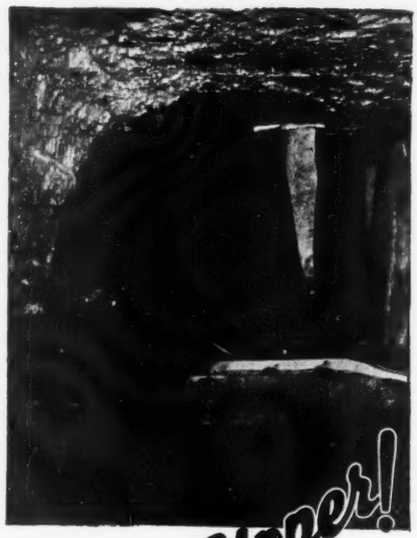
The Kehoe-Berge Coal Co. was notified Jan. 28 in a letter from Mr. Walsh to John C. Kehoe Jr., general manager, that its fatality record during 1947 was second in the anthracite industry and that it had surpassed practically all of the twenty-odd bituminous producing states.

Safety personnel of the company include James A. Bradbury, general safety director, and the following safety men at the various operations: Red Ash, Roger Hines Jr.; William A., Roger Hines Sr.; Stevens Shaft, Anthony Levandosky; No. 11, Seven Koch; Kehoe-Berge breaker, Andrew Roslewicz.

Gasification Tests To Be Resumed Soon

Experiments in underground gasification of coal, performed last year with but limited success, will be tried again this summer, with the Alabama Power Co. and the U. S. Bureau of Mines again working together.

Last year's experiments conducted



Pepper Upper!

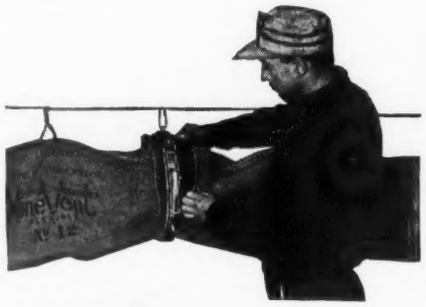
AIR delivered fresh by MineVent TUBING

It's the amount of "breathable" air that reaches the areas where men are working that counts!

MINEVENT TUBING delivers fresh air right where it is needed—peps up miners, increases output. This flexible blower pipe is made in four grades of tough material that withstands handling — flame, fungi and leak proofed. Sizes 8" to 36" — long lengths that can be cut to any size on the spot. Patented couplings and hangers speed installation or removal, as shown below.

ABC JUTE BRATTICE CLOTH is the proved material for sealing off inactive areas. Durable under all conditions. Chemically treated to resist flame, mildew and leakage.

It will pay you to consult your ABC Mine Ventilation Engineer or write for samples and prices.



AMERICAN BRATTICE CLOTH CORP.

WARSAW, INDIANA

One more reason why *Securityflex* is a *Safer* mine cable...

ADHESION between jacket and insulation in Securityflex* parallel mine cable is one more reason for this cable's extra safety and long service. A special process binds jacket and insulation together to form a rugged, *solid block* of synthetic rubber and Neoprene around conductors.

Anti-Short Breaker Strip between conductors cuts failures to a minimum—another feature of Securityflex parallel cable contributing to uninterrupted mine operation. Securityflex meets the Pennsylvania Flame Test, withstands severe overloads, meets Bureau of Mines diameter specifications, will not kink, twist or tear and resists abrasion.

For *unparalleled* mine safety: Securityflex Parallel Mine Cable.

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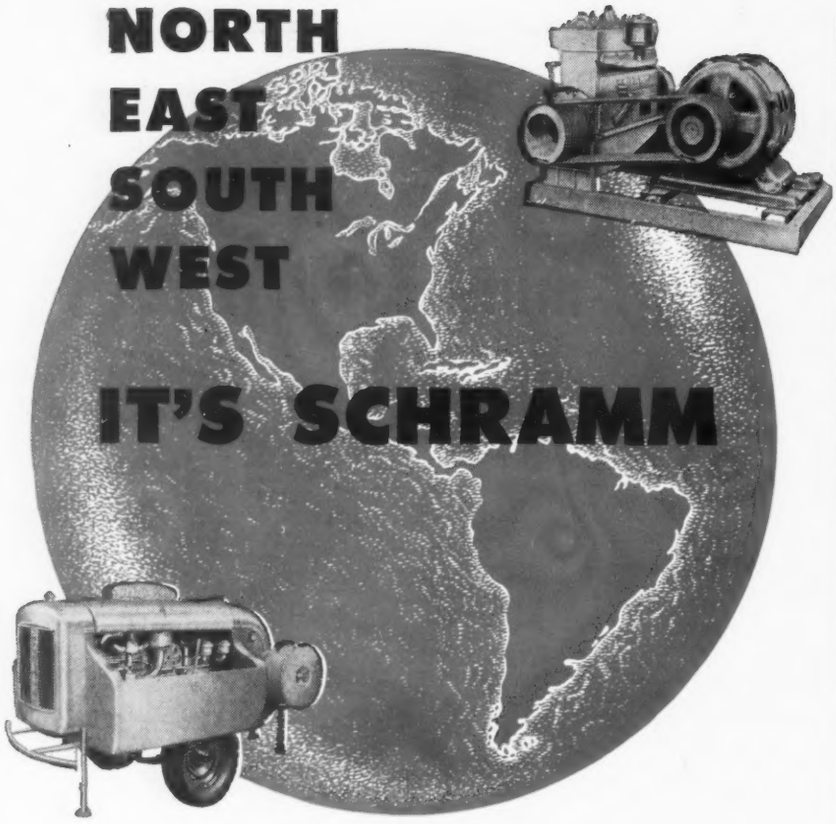

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at Gorgas, Ala., worked surprisingly well, but the gas obtained was of too-low B.t.u. content for either conversion to liquid fuel or burning for power. The low B.t.u. content was attributed to leakage of gas and air pressure through the thin cover (30 ft.) over the burning coal seam.

The new experiments will be carried out in a coal bed some 100 to 125 ft. below the surface. Increased air pressure, supplied by a war-surplus turbo-compressor, at the more dependable depth is expected to make the difference between the 50-B.t.u. gas value obtained last year and a 150-B.t.u. goal set for the next experiments.

The original Gorgas experiment utilized a rectangular coal seam encompassed by a U-shaped, horizontal shaft (*Coal Age*, May, 1947, p. 74). Air was blown into one end of the shaft and the gas from the burning coal was drawn from the other end. The coal fire lay between the two shafts, along the bottom of the U-shaped section. This method has been discarded.

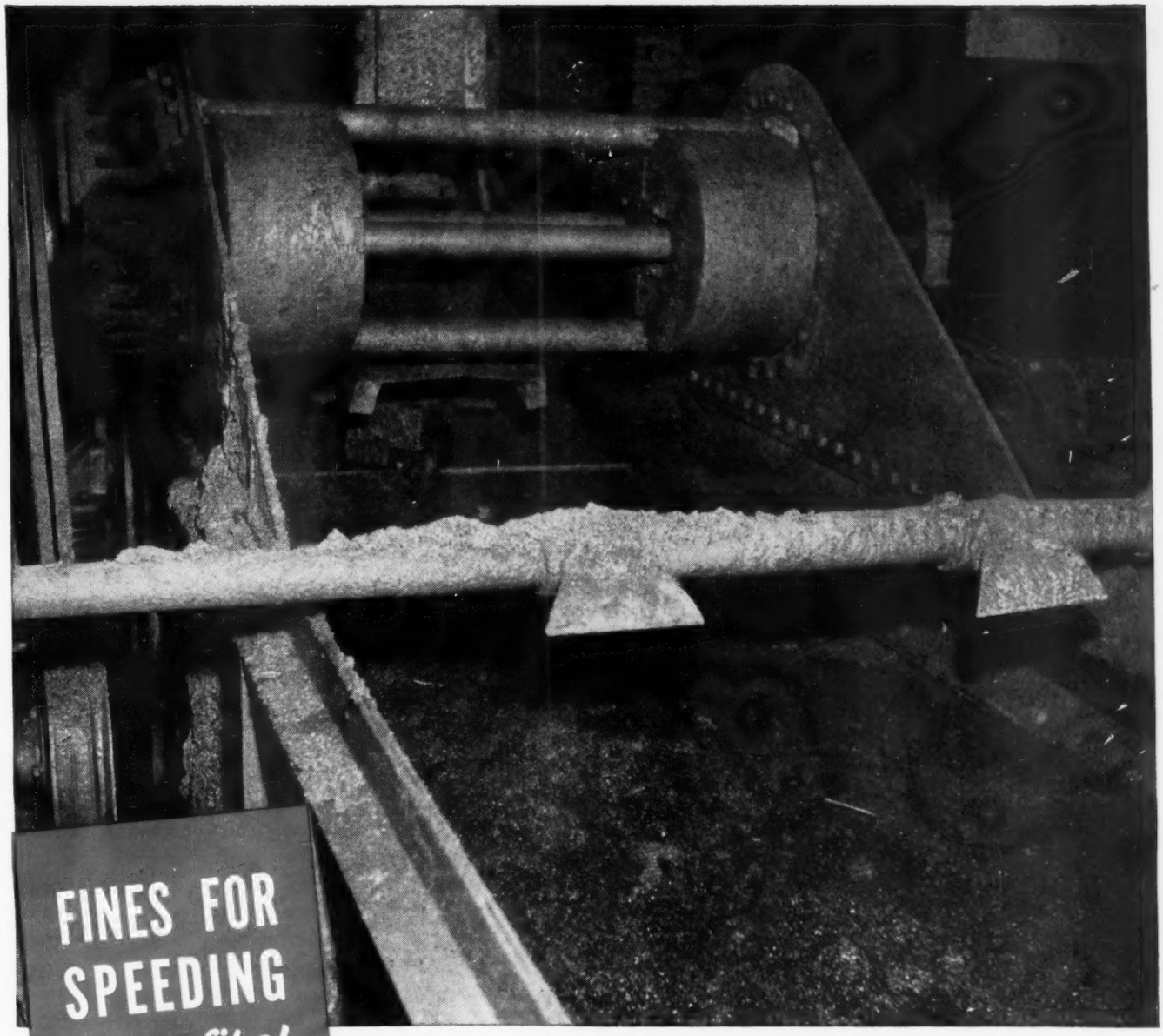
In the new experiment, a line of vertical holes drilled down to the coal will be utilized, connected, initially, by a horizontal shaft drilled from the side of the coal bed. The vertical holes will be 30 in. in diameter and will be spaced about 300 ft. apart, in line. Fires will be started in the 30-in. coal seam at the bottom and between the vertical holes; then the horizontal shaft will be sealed. Air under pressure will be forced down one set of holes, and the gas will be drawn from the opposing ones.

As the fires progress, a line of secondary holes will be drilled ahead of the burning area and spaced off-center from the original line. Through this pyramiding of holes, it is hoped to maintain a constantly progressing line of fire, with the blow-and-draw process maintained. It is expected that as each new hole is opened, the heavy air pressure will filter through the coal and create new draft channels to the progressing burning area.

The coal to be used is contained in an oval-shaped, 200-acre plane lying within and half way up a hill. Because of the position of the coal, it will be an easy matter to drill the horizontal entry to the seam and still maintain the 100-ft. overburden.

Just when the experiment will start depends on: (1) when the WAA delivers the turbo-compressor to be used to supply air pressure; (2) when the Bureau of Mines' budget can be stretched to provide its part of the finances; and (3) how soon a practical method of getting steam under high pressure to the turbine can be devised.

Underground gasification in this country is new. One other recent experiment in subterranean gasification—started by the Union Carbide & Carbon Co. in West Virginia—is reportedly still going on, but the com-



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The Robins Eliptex Dewaterizer will recover the tons of valuable fines you have been losing in your sludge tank during the washing operation. It will help you speed those fines on their way to waiting industrial users.

Best of all, you can buy a Robins Eliptex Dewaterizer for only a fraction of what other dewatering equipment costs. Moreover, it leaves as little as 12% surface moisture on coal as small as ⅛" to 0".

It will pay you to investigate these and other savings *proved* in day-to-day runs in actual plants. Write Robins today for full details on how you can save with the new Robins Eliptex Dewaterizer.

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Particularly adapted to conveyor loading, the 12BU has the Joy patented gathering mechanism which is driven by two motors, one for each arm. Its articulated chain conveyor may be swung horizontally 45° on either side of the center line.

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JOY MANUFACTURING COMPANY

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pany has withheld results. In Europe, the Belgians and the Russians have been conducting similar experiments for some years, with varying degrees of success. The Russians have claimed the greatest success so far.

•

Coal Companies Hit School Coal Tax

An injunction to prevent the Tremont Township school district from enforcing the ordinance taxing coal mined in the district (*Coal Age*, February, p. 160) was sought by two coal companies in Schuylkill County Court Jan. 30.

The ordinance, which became effective on that date, sets a 5c. tax on each ton of deep-mined coal and 10c. on each ton strip-mined. The William Stripping Co., of Pottsville, and the Blackwood Coal Co., of Tremont Township, sought the injunction, claiming that the tax is illegal since they pay a property or real estate tax. An attorney for the school board said the ordinance would be repealed as soon as back school taxes had been collected.

Two other township school boards —Reilly and Manheim—have passed similar ordinances and East Norwegian posted notice it would take similar action Feb. 18.

In St. Clair township, near Jeannette, Pa., the school board on Feb. 8 took initial steps to levy a tax on all persons engaged in mining and removing coal or loam and in cutting and sawing pit and fence posts and lumber. The proposed resolution which, if adopted, would become effective March 15, would impose a 10c. per ton levy on coal; ½c. on pit props, fence posts and posts cut for sale at sizes from 48 to 120 in. in length; 3c. on posts over 120 in.; 10c. a ton on all loam mined; and $1 for each 1,000 board feet of logs cut for sawing and hauled outside the district, as well as all lumber sawed in the district.

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Grant Favored for Survey of Anthracite Mine Water

Approval of a $560,000 study of excess water in anthracite mines was voted by a House public lands subcommittee in Washington on Feb. 6 after James Boyd, director, U. S. Bureau of Mines, had testified that 90 percent of Pennsylvania anthracite production will be lost if underground flooding is not stopped. The bill goes next to the full committee for consideration.

"The constant danger of water breaking through is a live threat to the miners," Mr. Boyd declared, and both large and small companies "are beginning to find it too expensive to pump out excess water." Mr. Boyd's testimony was supported by S. H. Ash, chief of the Bureau's safety di-

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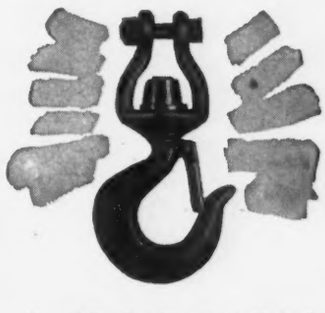
Laughlin Safety Hook . . . "The Latch Locks The Load" . . . adds a big safety factor to every lift. Sturdy latch, stainless steel spring. For every industrial application.



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PROGRESS

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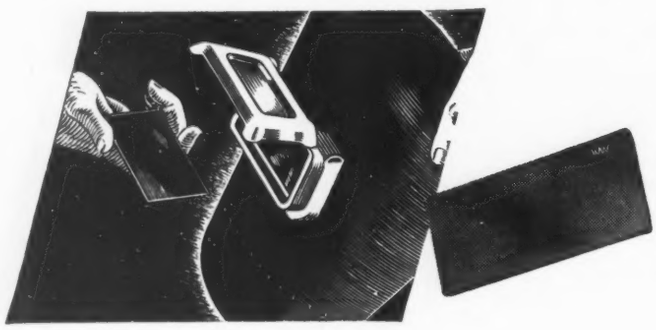

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vision, who said that the water problem is "so serious, many abandoned mines must be constantly pumped out to relieve the pressure on water in active mines."

Others testifying in support of the bill included Henry A. Dierks, vice president and general manager, Glen Alden Coal Co.; Cadwallader Evans, president, Hudson Coal Co.; George A. Roos, vice president, Philadelphia & Reading Coal & Iron Co.; and Robert Howe, international representative, U.M.W.A.

The bill under consideration was introduced by Representative Fenton, of Pennsylvania, and would authorize the Secretary of the Interior, through the Bureau of Mines, to assign engineers to study the problem and report to Congress on how it can be solved, what it would cost and how it could be financed.

•

Plans Announced for Anthracite Conference

New developments and trends in mining and utilization of anthracite will be featured at the sixth annual Anthracite Conference to be held at Lehigh University May 6-7, according to preliminary plans announced by Prof. A. Copeland Callen, head of Lehigh's department of mining engineering, who is chairman of the committee planning the sessions.

A special feature of the program this year will be a symposium on the use of anthracite in power plants. Guests at this session will be members of the A.I.M.E., A.I.E.E., A.S.M.E. and A.S.C.E.

Honorary chairmen for the conference are Dr. Martin D. Whitaker, president, Lehigh University; Frank W. Earnest Jr., president, Anthracite Institute; C. Millard Dodson, president, Weston Dodson & Co., and J. B. Warriner, chairman of the board, Lehigh Navigation Coal Co.

Raymond C. Johnson, vice-president in charge of research, Anthracite Institute, Wilkes-Barre, will serve as vice-chairman of the conference. Other committee members are:

Cadwallader Evans Jr., president, Hudson Coal Co., Scranton; Evan Evans, president, Lehigh Navigation Coal Co., Lansford; Edward Griffith, president, Glen Alden Coal Co., Wilkes-Barre; C. A. Garner, vice-president, Jeddo-Highland Coal Co., Jeddo; C. A. Gibbons, vice president and general manager, Susquehanna Collieries Division, M. A. Hanna Co., Nanticoke; Paul A. Mulcey, director, Anthracite Institute laboratory, Wilkes-Barre; J. M. Crosby, assistant to the president, Anthracite Institute, Wilkes-Barre; Viola Schlacks, Philadelphia & Reading Coal & Iron Co., Philadelphia; Lillian Cohen and G. H. Israel, Lehigh Navigation Coal Co., Philadelphia; Wilmon Kaiser, Pennsylvania Coal Co., Scranton; R. C. Parker and C. M. McHeffey, Hudson

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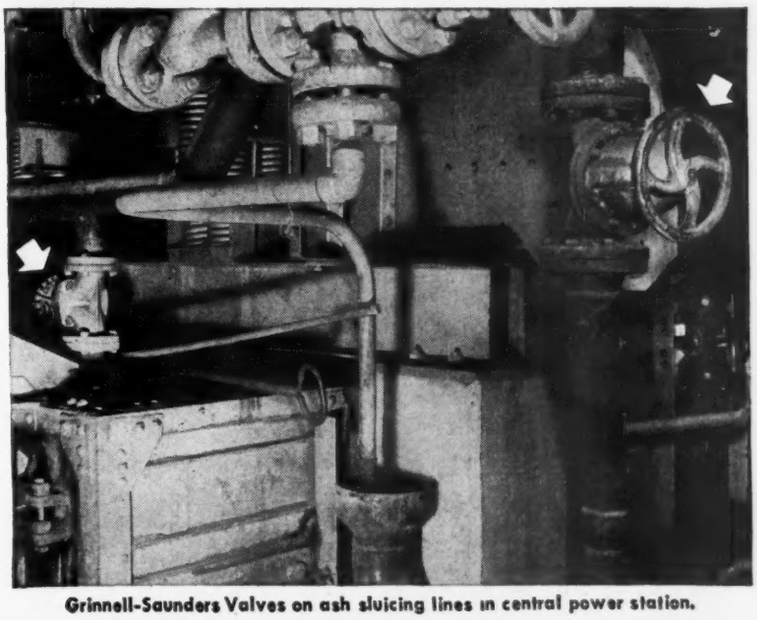

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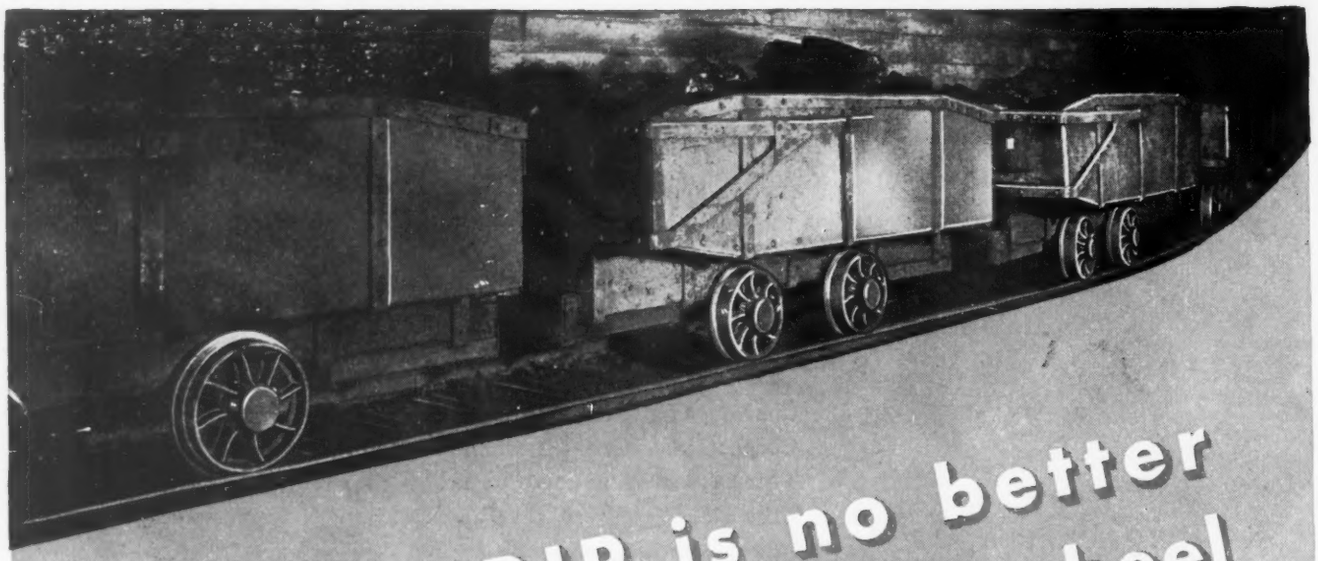

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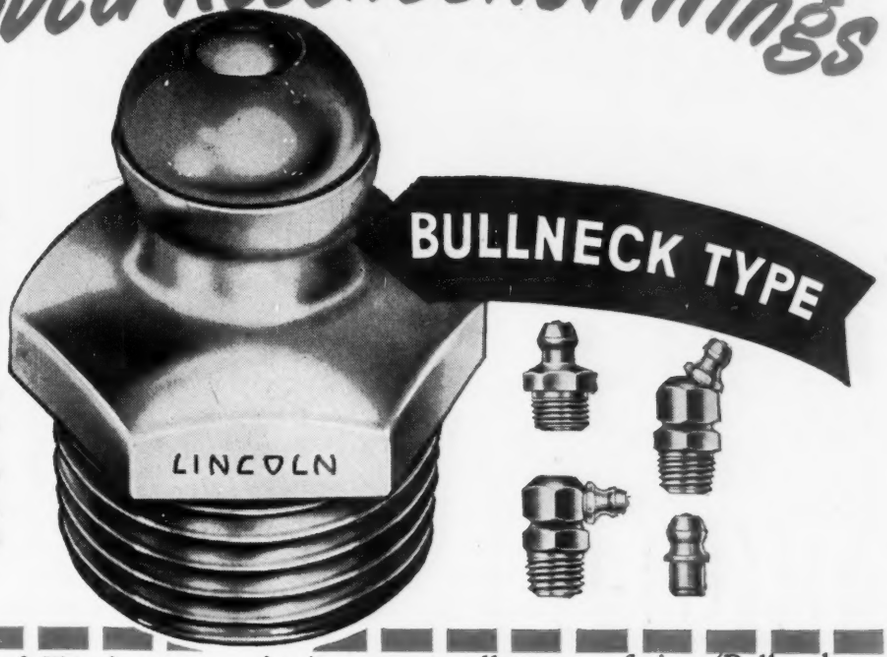

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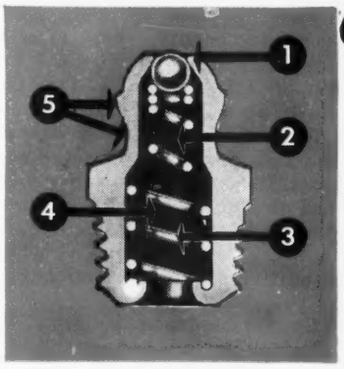

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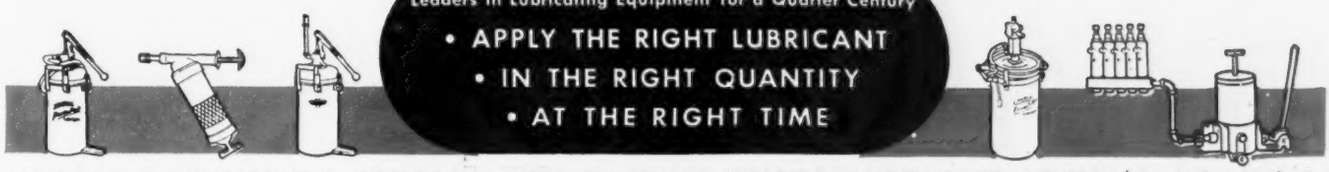

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•

Union Pickets Seek to Organize Strippers

Wildcat stoppages and mass picketing plagued some strip and truck operations in Virginia, Tennessee and Kentucky in January as union forces sought to sign unorganized workers into the union.

Near Dunlap, Tenn., a "tense" situation developed Jan. 11-12 when a group described as "a mob of several hundred union men" told scores of truck drivers, many of them farmers hauling coal during the winter farm lull, that they must become members of the U.M.W.A. or stop hauling coal. Several stripping companies operate in the area. The U.M.W.A. moves provoked a protest from local representatives of the A.F.L., who charged the U.M.W.A. with raiding. Many of the truck drivers, it was pointed out, already are members of the A.F.L. Work continued in the pits at a "slow" pace, amid threats of violence and retaliation on both sides, and there were conflicting statements as to the success of the U.M.W.A. organizing efforts.

Work was resumed Jan. 26 at the Ralph E. Mills Co.'s strip operations in Buchanan county, Va., after a three-day stoppage that idled 600 employees of the nearby Red Jacket Coal Corp. as well as the strip workers. The walkout by Red Jacket miners was a protest against the non-union strip operations. Both groups returned to work after management of the strip mines was taken over by Blythe Bros. Construction Co., whose representatives signed a union contract.

Earlier, in Johnson county, Ky., near Paintsville, an estimated 2,000 union and non-union miners were idle for one to three days when the U.M.W.A. declared a holiday on Jan. 21 to picket 40 non-union truck mines and 11 loading ramps. U.M.W.A. miners returned to their jobs the next day while operators of the 40 non-union mines petitioned for an injunction to end picketing of their properties. The petition charged that illegal picketing methods had been used by the union men.

At Wilton, Ky., about 300 men, some of them armed, appeared Feb. 9 at a strip mine operated by B. Perini & Sons and forced the mine superintendent and about 40 workers to sign union cards. Four men, according to the superintendent, were injured in

6-Yard Special Light Weight
Coal Loading Dipper on Lima 1201

Faster, Easier Digging with ESCO DIPPER and DRAGLINE BUCKETS

LIGHT WEIGHT COAL LOADING DIPPER
All fabricated bucket for loading shot coal. 1 to 8 yards.

CAST-WELDED DIPPER
For general purpose work. ⅜ to 6½ yards.

ALL-CAST MANGANESE DIPPER
For extremely severe service. ⅜ to 5 yards.

MEDIUM WEIGHT DRAGLINE
Used where extra weight and strength are not required. ⅜ to 20 yards.

STRIPPING DRAGLINE BUCKETS
Especially designed for coal or phosphate stripping. 1 to 18 yards.

STANDARD TYPE DRAGLINE
For tough digging jobs. ½ to 18 yards.

HEAVY DUTY TYPE DRAGLINE
For the very hardest digging. ¾ to 10 yards.

6-Yard Stripping Dragline on 5W Monighan with 120-foot boom. Parts shown in red are manganese steel castings.

WRITE FOR LITERATURE. Illustrated catalogs giving complete specifications and construction details of these strongest-per-pound buckets will be sent you upon request. See your nearest ESCO representative or fill in and mail the coupon below.

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ORIGINAL MOTOR ——— **1,500 H. P.**
705 RPM
2,200 V.

to meet changed needs
CHANGED TO ——— **1,200 H. P.**
600 RPM
2,200 V.

to meet still other needs
CHANGED AGAIN TO ——— **1,875 H. P.**
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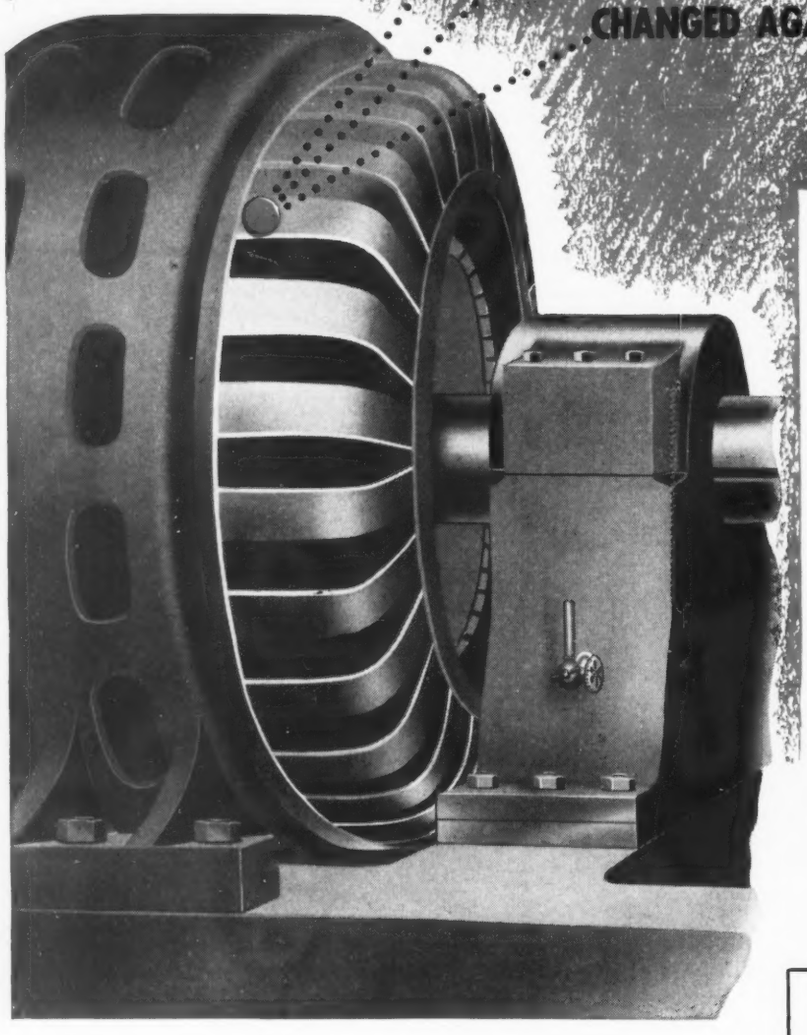

Our first acquaintance with this motor was in May, 1941, when we were asked by a large steel producer to change the motor to 600 RPM. After faithful war-production service, the motor came to us again. This time, another steel mill operator requested that we change the operating speed to 900 RPM at maximum horsepower.

NATIONAL reconversions have twice adapted this motor to the changed production requirements. Each change made this unit a designed part of the manufacturing process. Experienced workmanship and NATIONAL uniformly-superior windings combined to build long-lived service into a piece of equipment which no longer fitted into the new production scheme.

Progressive engineering, such as practicea by NATIONAL, is basic to your conversion problems. The operating characteristics of your rotating electrical equipment can often be redesigned to meet new conditions imposed by different drive requirements.

For economy, operate with the correct horsepower.

Relieve the strain on overloaded electrical equipment by having it redesigned for the job.

Rotating electrical equipment is the pulse of your production line. When this factor is out of phase with your requirements, schedules cannot be economically maintained. A NATIONAL reconversion is the answer.

Call in your National engineer. Let him apply his progressive engineering methods to the problem of tailoring your power facilities to your present requirements. Changes in horsepower, speed, and operating voltage can be accomplished at comparatively low cost for the results obtained.

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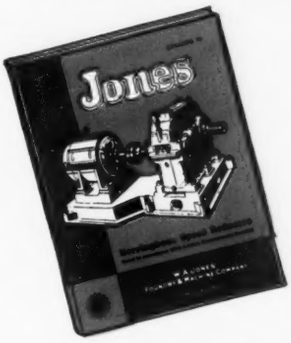
DOUBLE!
TRIPLE!

. . . . *Every type of Herringbone Speed Reducer that you might need*

Jones Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1 in ratings from 1.3 to 440 H.P. Double (Type DH) reducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly. Liberal stocks are carried to facilitate shipments.



Here's Complete Information About the Application of Herringbone Reducers

This 128-page catalog of Jones Herringbone Reducers presents a vast amount of data relating to Herringbone Reduction Units. Illustrations show a broad range of herringbone reducer applications and the technical information shows how to select reducers for all conditions of service in accordance with the A.G.M.A. recommended practice.

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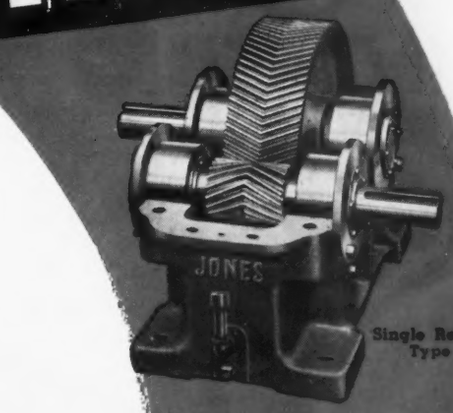
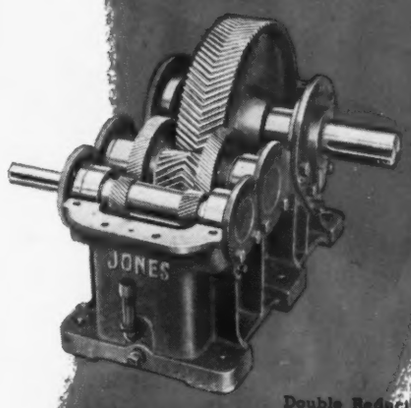
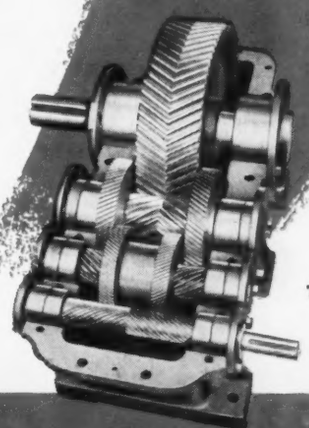


Single Reduction Type SH



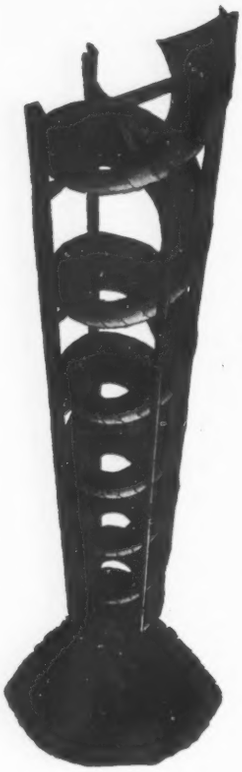
Double Reduction Type DH



Triple Reduction Type TH

Jones

HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS
PULLEYS • GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • FLEXIBLE COUPLINGS



. . . AVOID BREAKAGE

The advantage of Holmes' spiral over previous chutes of this nature lies in the design of the carrying surface, which is formed much as the bowl of a race-track, having no retaining wall on the inside edge. Elimination of this inside edge allows the material to slide gently onto the peak of the pile without droppage. By the same token, the peak of the pile may be carried around the interior of the bin in such a manner that the material is deposited in overlapping layers, where the problem of segregation is present.

ROBERT HOLMES AND BROS.
BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES
DANVILLE, ILLINOIS

With the advent of scientific consumption of coal and the increased demand for a clean, sized product, much study was given to methods by which so fragile a commodity might be handled into bins and silos without excessive degradation. This problem was solved by using lowering spirals designed to take the material from the conveyor and carry it gently to the bottom of the bin.

Design is such that the lowering speed of the material is automatically retarded when it begins to exceed a safe limit. Regardless of the distance the material travels, its velocity remains uniform; and it reaches the bottom in a continuous, even stream.

Spirals are available with the carrying surface covered to form a spiral tube for lowering above bin enclosure and thus give weather protection.

Coal Bunker Storage

fighting that preceded the signing. The superintendent said he did not know the name of the union he was forced to sign with. The next day, Judge J. B. Johnson ordered the sheriff of Knox county to round up witnesses to the fracas and subpoena them for appearance before the grand jury, then in session. The judge also directed the grand jury to act promptly. Abe Vales, district president, U.M.W.A., Middlesboro, denied knowing anything about the incident.

•

Eight Miners Die In Arkansas Blast

Eight miners were killed in an explosion Feb. 8 in the Sunshine mine, near Greenwood, Ark., some 20 miles south of Fort Smith. The blast, the first in the 10-year history of the mine, occurred about 400 ft. underground, at the end of a 4,000-ft. slope, as the day and night shifts were preparing to change. The mine was undergoing development at the time of the explosion and the eight men killed were the only ones at work. State mine inspectors moved in the day after to search for the cause of the blast.

•

Kentucky Senate Gets Strip, Deep-Mine Bills

Two bills affecting coal mining, one to regulate strip activities and the other to authorize underground access to unmined coal through another's property, were placed in the Kentucky Senate's hopper at the end of January.

The stripping bill, offered by Senator Carlos B. Embry, would require strip-mine operators to register with the State Department of Mines and Minerals and post bond of $200 per acre, with a minimum bond of $2,000, to guarantee sealing the exposed face of unmined coal, leveling and rounding banks and planting shrubs, trees or grass.

The mine-access bill, already accepted by the House, won the approval of a Senate committee and was scheduled for an early vote in that chamber. The proposed law would permit an operator who cannot reach his unmined coal by an overland route to gain underground access to it through another's property through condemnation proceedings. Supporters of the bill charged that many small operators in eastern Kentucky had been forced to sell their holdings to big corporations when underground access was denied and surface terrain made overland access impossible. Opponents of the bill declared that it would permit destruction of million-dollar operations by impeding orderly mining development and subjecting large operations to damage by water or gas from small, worked-out mines.

GROUNDED FOR SAFETY

Look for the State of Pennsylvania seal of approval-No. P-105 —molded in the jacket surface!

Rome 60

6 AWG, 48 strands, parallel duplex (twin) Mining Machine Cable with ground wire.

MINING CABLES

It is recommended that an adequate ground be provided for all machine frames. The frame of a portable machine which receives power from an external source and which can not be considered as being in intimate electrical contact with the earth, as when resting on timber, or mounted on rubber tires, shall be adequately grounded. The power conductors shall not be used for grounding.

Frames of longwall mining machines that use a junction box or its equivalent shall be electrically connected to the latter by a separate conductor in the portable cable.

All drills and other tools intended to be held in the hands or supported against the body while in use shall have a grounding conductor in addition to the power conductors in the portable cable.

As indicated by the accompanying excerpts from U.S. Bureau of Mines, Schedule 2E, portable equipment under certain mine conditions must be properly grounded. Where compliance with Schedule 2E must be considered, you can be assured of adequate grounding by specifying Rome 60 Mining Cables.

In addition, Rome 60 Mining Cables, with jacket and fillers of Neoprene, are rugged and unaffected by acids or alkalies . . . *for longer life;* highly resistant to flame and mechanical shock . . . *for greater safety.* Give yourself the advantage of these better cables and lower operating expenses.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

THE GREAT LAKES' NEWESTC

B & O's great Lorain Docks

RIGHT ON THE LAKEFRONT

The Great Lakes' Newest facilities for the trans-shipment of coal and ore, at Lorain, Ohio, were completed in the Fall of 1947 and are ready to serve you. This outstanding step in B&O's progressive program of service provides the port of Lorain with new docks 1100 feet in length. The new facilities have been constructed to provide the maximum in safety, efficiency and careful handling. The water depth at dockside and clearance within breakwater allow unusual maneuverability for even the largest lake vessels.

A completely up-to-date Car Dumper is located on the West Dock. Electrically operated, the dumper and accessories will handle and dump 70-ton cars at the continuous rate of a car a minute. The dumper pan has a capacity of 125 tons and is equipped with automatic water sluicing which sprays coal to meet any specification of shipper or receiver. A telescopic chute of the latest type, equipped with trimmer, loads all grades of coal quickly and efficiently with the minimum of degradation.

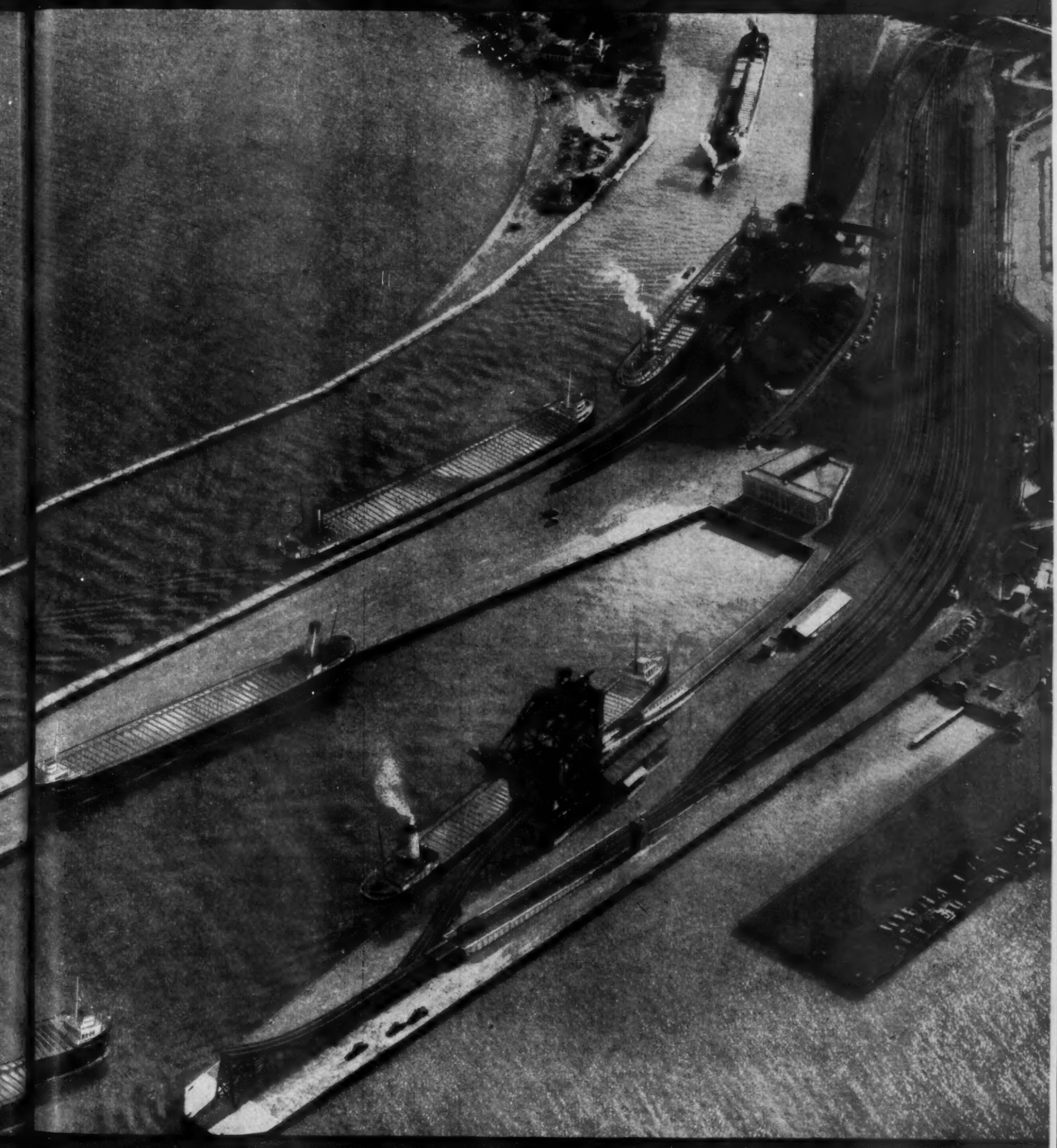
Extensive Yard Facilities support dock operations. Trackage with 4,000 car capacity, to facilitate fast loading and unloading, extends for 4 miles behind the dumper. Modern, automatic telephone equipment, radio communication and ship to shore telephone are used for directing all dock and yard activities. No detail has been overlooked in making this Lake Erie's most modern coal handling facility.

For fast, efficient and convenient coal and ore shipment, right on the lakefront

LOOK to LORAIN!

BALTIMORE & OHIO RAILROAD

7COAL AND ORE FACILITIES



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OF THE NATION

BITUMINOUS COALS FOR EVERY PURPOSE

MINE JACKING GOES FASTER and more safely with SIMPLEX Ratchet Lowering JACKS

No. 1017
10 TON CAPACITY

Single Acting Jacks That Lift Full Capacity on Cap or Toe!

Use these single acting jacks for safe, sure operation in mine jacking—for lifting, lowering, pushing or pulling. Double lever sockets speed work in cramped quarters and in angular lifting. All models will lift full capacity on the toe or on the cap—a feature that only Simplex Ratchet Lowering Jacks give you.

Best materials are used throughout for long-life operation under all conditions. When you specify Simplex you get jacks made by the manufacturer awarded the only gold medal for the safety of jacks by the American Museum of Safety.

Ratchet lowering jacks are available in 14 models with capacities ranging from 5 to 35 tons and lifts from 7 to 18 inches. All have two-way standard lever socket except the largest models. Delivered with lever included.

For full information on all types of Simplex mine jacking equipment write for Bulletin Mines 47.

SIMPLEX HYDRAULIC JACKS

For hydraulic ease of operation plus complete safety on heavy duty jacking in mines. Available in eight models to handle from 3 to 100 tons — tested to 50% overload. Send for Bulletin HJ 47.

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LEVER • SCREW • HYDRAULIC
Jacks
TEMPLETON, KENLY & COMPANY
1040 South Central Avenue, Chicago 44, Illinois

Pennsylvania Strippers Start Reclamation School

A two-day school in land reclamation to enable Pennsylvania stripping operators to comply with the state's open-pit mining act was set for Feb. 25 and 26 at Kittanning, Pa., under sponsorship of the Mineral Producers Association and with the cooperation of the state Department of Forests and Waters. The school was set up after the law had been declared constitutional. Detailed courses were planned in requirements and procedure of the act, planting methods and characteristics of various trees, shrubs, grasses and soils, together with climatic requirements of each, and possible uses of the crops at maturity.

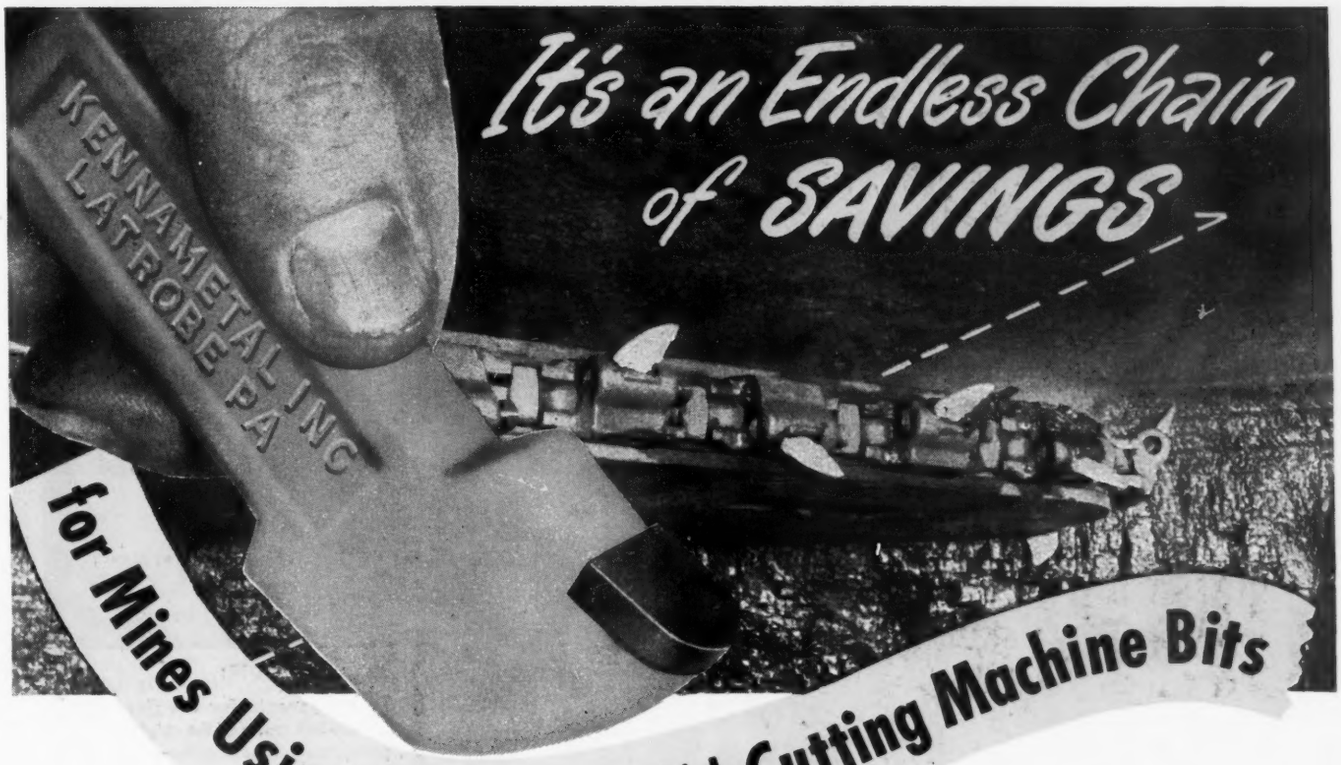
•

Foreign Developments

Paris—The nationalized French coal mines have reportedly worked out a three-way deal that will allow them to buy $10,000,000 of machinery and equipment in the United States to push modernization of the Lorraine mines. After several months of negotiation, two Swiss banks have agreed to lend the money to the dollar-poor French. To repay the loan, the French mines will then ship coal to Switzerland, thus acquiring Swiss francs.

An agreement by the British and United States governments to transfer control of coal production from the Saar to the French government was reported late in January. Under the arrangement, which is to be effective April 1, output from the Saar will be considered as French and will be regulated by that government. While the French government is expected to continue offering a considerable tonnage to the Coal Committee of the Economic Commission for Europe for allocation, it is understood that that quantity will be decreased during the next year until April 1, 1949, when the entire Saar output will be utilized by France. In addition to securing more Saar Coal, the French economy also will profit from making payment for it in francs in the future, rather than in dollars as in the past.

Moscow—The coal industry's five-year plan, with a goal of 250,000,000 tons per year in 1950, will be completed a year ahead of schedule, according to open letters received by Stalin from coal miners in fields that completed the 1947 program ahead of



It's an Endless Chain of SAVINGS →

for Mines Using KENNAMETAL Cutting Machine Bits

Lower Bit Cost per Ton

Kennametal Bits cut many more places than steel bits before they become dull; can be resharpened many times. Typical reports by users:

Ohio No. 5 seam—.48¢ bit cost per ton.
Ohio No. 8 seam—.35¢ bit cost per ton.
Penna "B"—.4¢ bit cost per ton.
W. Va. mine—Bit cost per ton reduced 75%.

Less Maintenance on Machine

Free-cutting Kennametal Bits frequently pay for themselves by reducing maintenance work on mining machines. Example: Butler County, Pa. mine—"The reduction in cost of repairing friction drums and replacing feed and tail ropes and other worn-out parts is more than the cost of Kennametal Bits."

Reduced Power Costs

Typical reports: Pittsburgh seam—"Power consumption reduced 33% since we equipped with Kennametal Bits." Kentucky mine—"Power reading for steel bits was 150 to 200 amperes as compared to 80 amperes using Kennametal Bits."

More Saleable Coal

In seven out of ten cases Kennametal Bits produce coarser cuttings, less dust. Example: Cedar Grove, W. Va. seam—30% coarser cuttings by screen test.

Greater Production

Kennametal Bits require fewer bit changes—less time is wasted changing and resetting. Fewer men are needed to handle, sharpen, and haul bits to and from the face. Examples: Kanawha County, W. Va. mine—"Kennametal Bits cut 27 places before becoming dull; over 300 places before being replaced." Fayette County, W. Va. mine—"Before Kennametal Bits were used, the machine men worked overtime to keep the loader supplied. Now the cutting crews work only regular shift hours; easily keep plenty of coal available for loading."

Kennametal Bits cut faster, wear longer, cost *less* to keep on the job. They save valuable time at the face; help balance operation. Write for factual performance data "Form MM-60".

Mining Division, Kennametal Inc., Latrobe, Pa.

Kennametal Outwears Steel 100 to 1

Kennametal cemented carbide is much harder than steel (up to 80.6 on the Rockwell C scale as compared to 65-66 maximum for steel). Its compressive strength is approximately 33% higher, and its resistance to deformation is 2 to 3 times that of steel. The combination of these characteristics enable it, as a general rule, to outlast steel up to 100 times.

KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS

NOTE:

To compensate for the five-eighths-inch crown of the original pulley, one inch of metal was left in the center of the motor pulley as can be seen in this photograph.

POWER PLANT EXPENSE REDUCED OVER $3,000 ANNUALLY

Boilers and machinery in the power plant of a large Central Ohio clay products manufacturer were badly in need of repairs. To replace worn-out equipment called for large capital expenditures and even with new equipment, estimated operating expenses loomed large. The manufacturer turned to his local Dayton V-Belt Distributor for suggestions. He recommended replacing the original prime mover with a 250-HP electric motor. This eliminated the necessity of replacing and operating the worn-out boilers. Further, though only 13 feet of floor space were available, the Distributor worked out a Dayton V-Belt short-center drive that made use of the original, flat, 8-foot-diameter pulley without removing the 5/8-inch crown.

In the first year of operation, the new motor and drive reduced power plant operating costs over $3,000!

Your own local Dayton V-Belt Distributor can give you similar help with your power transmission problems. With his specialized knowledge he can eliminate nearly 95 per cent of all power drive troubles using standard Dayton V-Belts and the power drive accessory equipment he stocks. If necessary, he can quickly secure the aid of a Dayton power transmission specialist. So, for prompt, profitable solutions to your drive problems call your local Dayton V-Belt Distributor.

THE DAYTON RUBBER COMPANY

Main Office and Factory: Dayton 1, Ohio

Branch Offices: Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, Minneapolis, New York, Philadelphia, St. Louis

V-Belt Buyers! A leading mill supply house near you offers specialized Dayton V-Belt service. Look for the name under the trade name heading "Dayton V-Belts" in the yellow pages of your telephone directory.

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

schedule. These letters summarized the coal situation at the end of 1947 as follows:

Eastern fields—Estimated 12.4 miles of new stopes opened, with total output 60 percent above 1940 and further expansion scheduled for 1948 and 1949. Plans call for 20 new mines in the Karaganda field with annual output of 12,000,000 tons, four new cuts and one mine at Sverdlovskugol with capacity of 4,150,000 tons and lengthening stopes at Molotovugol by 13,000 ft. In the Soviet Far East, new fields are to be opened, many of them strip mines. Mechanization will be pushed upward to 58 percent in coal cutting and 97 percent in mine haulage.

Donbass—Production now is near prewar level of 80,000,000 tons. In the Rostov field, 70 new mines have been opened since restoration began in 1944 and miners have pledged for 1948 an output 53 percent above 1940. The entire Donbass area is at more than two-thirds prewar capacity and 120 mines with a total capacity of 52,000,000 tons are scheduled for reopening and new construction by the end of 1949. Recovery in the Donbass and Moscow basins has been slowed by effects of the German occupation, which wrecked 60 percent of the region's capacity.

Central fields—Output of the Moscow basin in 1947 was 2½ times greater than in 1940. Four new mines totaling 1,000,000 tons capacity were opened. During 1948, all mines will operate two shifts for mining and a third for repair and development work. The Tula field passed its 1947 goal by 200,000 tons and for 1948 plans to boost output 8 percent and increase capacity 15 percent. In the Nelidov field, about 250 miles from Leningrad, several large mines are being sunk as the first step to exploit local coal for industry in the Leningrad area, which up to now has been supplied by coal shipped upwards of 1,000 miles from the Donbass and Pechora regions. Development of pulverized-coal stokers for central-station boilers has partly offset the high ash content and general low quality of Nelidov coal and a briquetting process developed by the Moscow Mining Institute has cut ash content from 38 to 18 or 20 percent. Nelidov coal seams average 5 to 10 ft. in thickness and are at depths easy to mine. In addition to new machinery, new workers are needed in the Nelidov field. To accommodate them, housing and public-service programs are under way.

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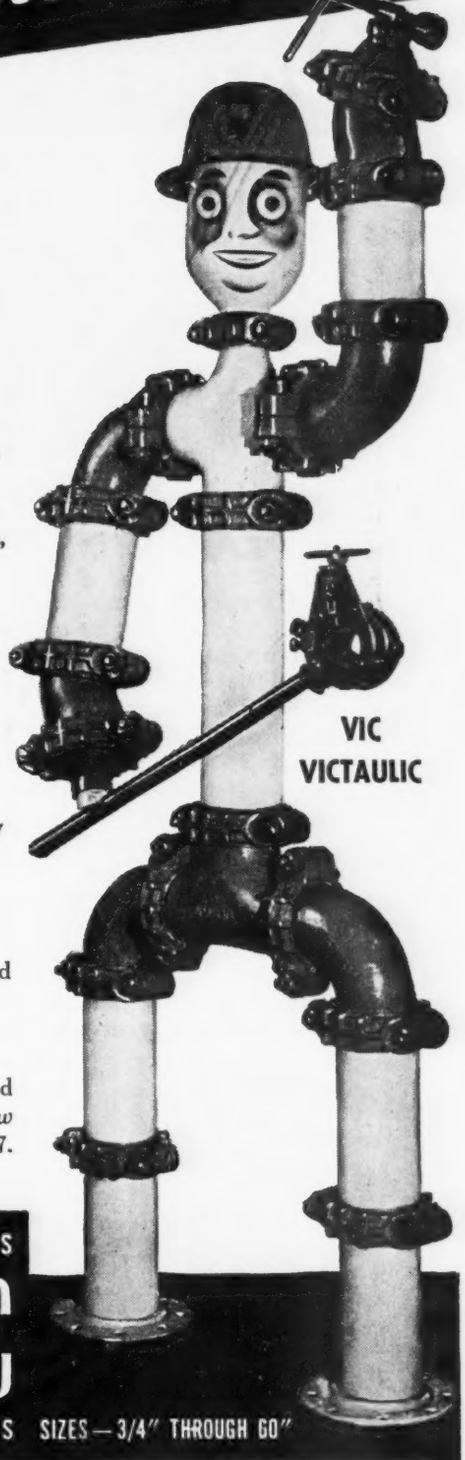
A.I.M.E. Meeting

(Cont'd From p. 112)

grouting in Shaft Sinking," by R. H. Allen, Well Service, Inc.; and "Solidifying Mines and Shaft Areas by Pressure Grouting," by B. H. Mott, Mott Core Drilling Co.

The successful application of con-

I'M YOUR MAN



FOR SURE SAVINGS OF TIME... MATERIAL...MONEY!

IN PIPING SYSTEMS that use VICTAULIC COUPLINGS a few turns of a T-wrench buttons up a line that's *flexible*—allowing pipe-line contraction or expansion, minimizing need for bends and fittings. All joints are slip-proof and leak-tight under pressure, vibration or sag . . . and a union at every joint makes repairs easier, permits 100% salvageability!

VICTAULIC Full-Flow Elbows, Tees and other FITTINGS are designed with wide, smooth sweeps and true circular walls that reduce frictional losses . . . increasing delivery and lowering pumping costs!

RESULT? Time, material and money saved!

ALSO REMEMBER!! Our *new* "VIC-GROOVER" automatically grooves pipe ends exactly right . . . with half the effort and twice the speed of ordinary pipe threaders!

FOR FULL ECONOMY . . . make your piping system *all* Victaulic!

Write today for Victaulic Catalog and Engineering Manual No. 44...and for *new* "VIC-GROOVER" Catalog No. VG-47.

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EFFICIENT FULL FLOW FITTINGS SIZES—3/4" THROUGH 60"

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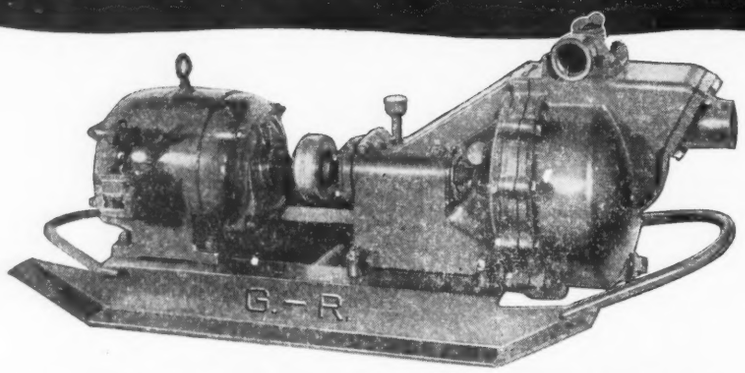
VERSATILITY
IN YOUR MINE GATHERING PUMPS



GORMAN-RUPP PUMPS DESIGNED FOR VARIABLE WORKING HEADS

In choosing the right pump for mine gathering service, be sure of its steep characteristic. A pump may have sufficient capacity when operating at low heads. But, does capacity drop way off at increased heads?

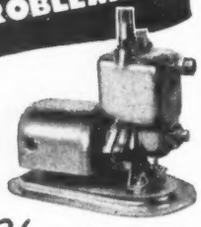
The ability to maintain nearly normal capacity under any working head is especially important in portable units. That's why you can put a Gorman-Rupp anywhere – on any kind of job. Frictional loss and increased lifts do not greatly affect its efficiency. Hence, smaller capacity pumps can often be used where heavy duty, more expensive units would otherwise be required.

This is just one of many advantages. Gorman-Rupp mine gathering pumps require unbelievably low headroom. They operate continuously, automatically – day after day – without attention. They provide positive, powerful self-priming without adjustments. Their extreme simplicity of design results in non-clogging, trouble-free service in the toughest duty.

Available in capacities from 50 to 200 GPM and heads up to 125 feet.

Ask for special mine bulletin No. 301-46.

COAL DUST PROBLEMS ?



Here's your answer. It's the Gorman-Rupp all bronze MINE SPRAY PUMP. Tool kit size - weighs only 27 lbs. - ready for instant use anywhere needed. Fitted for ¾" pipe or common garden hose. Lifts up to 25 feet – delivers 8 GPM at 40 pounds pressure. Maximum capacity 16 GPM – Maximum presure 50 lbs. Completely self-priming – electric motor driven.

Write for bulletin 7-ME-11.

Check THIS LIST FOR YOUR NEAREST GORMAN-RUPP DISTRIBUTOR

Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — — Union Supply Co., Denver, Colo. — General Machinery Co., Birmingham, Ala. — Superior Sterling Co., Bluefield, W. Va. — Athens Armature & Machinery Co., Athens, Ohio — Tennessee Mill and Mine Supply Company, Knoxville, Tenn. — Mine Service Company, Lothair, Ky.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

trolled grouting in the sinking of a shaft for a West Virginia operation where failure of conventional grouting methods was indicated reduced by three the nine boreholes originally planned, materially cut the quantity of cement required and resulted in an over-all saving of $8,000 to $10,000 in materials and drill time, said Mr. Allen. Two boreholes, No. 1 S. E. and No. 2 N. W., were first drilled for the 500-ft. shaft, each being grouted after drilling with five packer settings and uncontrolled cement. After No. 2 N. W. borehole was regrouted, using specially formulated batches of controlled flash-setting, expansible grout, followed by cement grout of controlled viscosities and weights, the hole produced only 3 g.p.m. of water, compared with 250 g.p.m. after uncontrolled grouting.

After No. 1 S. E. hole had been grouted with controlled grouting and redrilled, only 8 g.p.m. was indicated, a reduction of 88 g.p.m. Control of this type of operation requires not only a thorough knowledge of the materials used and their behavior, but exhaustive study and tests of the strata and water encountered to make control possible and experience in placing and setting, Mr. Allen emphasized.

A three-fold advantage results from employing the principles of pregrouting and controlled pressure grouting, stated Mr. Mott: (1), elimination of the greater part, or all, of the water problem in sinking a new shaft; (2) sealing-off of leaks in existing shafts without interrupting mine operations; and (3) solidifying wet headings driven under streams. When a large volume of water is encountered in driving headings under a stream, grouting may be less expensive than the cost of pumps, power and maintenance over a period of years.

In grouting for a shaft, a seven-hole layout, six holes in a circle beyond the circumference of the proposed shaft and one in the center, has usually been found satisfactory. The elevation in the hole at which the grout will be accepted, pressure necessary, as well as the amount of water taken on a water test, are fundamental data that must be predetermined, and when checked with the drilling log and the core itself, assist in determining the procedure for that particular hole. In headings underground, the testing and grouting of the drill holes is similar.

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New Mining Companies

Unconfirmed reports received list the following companies, among others, as having been incorporated to mine coal, with authorized capital and incorporators as listed:

Kentucky

Card Creek Coal Co., Pikeville; $16,000;

Industry is on the Move .... Westward

UNION PACIFIC RAILROAD COMPANY
OMAHA 2, NEBRASKA

G. F. ASHBY, PRESIDENT

To American Industry:

The Union Pacific West offers industry proximity to products of ranch, mine and forest...ample power, fuel, water...healthful living conditions in scenic, recreational regions...and native-born, high-type labor.

Our faith in the future of this vast territory is confirmed by our current 200-million-dollar investment program for new equipment, improved and expanded facilities to provide shippers and travelers with the utmost in rail transportation.

We are at your service.

Yours very truly,

G F Ashby

President,
Union Pacific Railroad

George F. Ashby

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

MESKER STEEL Evansville IND.

• PERMANENT
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• EASILY ERECTED
• FIRE AND WEATHER RESISTANT

THE MESKER ALL-STEEL PREFABRICATED UTILITY BUILDING

GARAGE AND SHOP BUILDINGS, SAHARA COAL COMPANY, HARRISBURG, ILLINOIS

A "MUST" IN THE COAL INDUSTRY

Where strength, economy and versatility are essential

Designed according to A. I. S. C. specifications, the Mesker prefabricated, sectional steel buildings are proving invaluable in present day coal mine operations. **There are no maintenance costs!**

Check these features against your own building requirements—Mesker All-Steel Prefabricated Utility Buildings are manufactured with:

(a) **Structural steel frames, of ROLLED structural sections, to standard specifications.**

(b) **Heavy 24-ga. galvanized sheet material covering.**

"Unit" construction simplifies the addition or removal of sections. Every piece and section is shop prefabricated.

At an amazingly small cost, and in a very short time, the Mesker sectional buildings may be moved from one location to another without the loss of a single bolt.

Mesker has the world's greatest line of prefabricated sectional steel buildings and steel construction materials.

GEO. L. MESKER STEEL CORP.
EVANSVILLE 8, INDIANA

WRITE, TODAY, FOR CATALOG "C"

Mr. and Mrs. Howard Martin, Mr. and Mrs. John R. Morris.

Clark Mountain Coal Co., Ashland; $10,000; W. T. and D. Avery Smith, Henry S. Fisher.

The Deere Creek Collieries, Ashland; $50,000; R. D. Davis, Camilla Droyles, Eleanore Cross.

Harris Mining Co., Inc., Corbin; $20,000; Con Harris, Carl C. Harris, Elmer Bump.

Moss-Keesee Coal Co., Belfry; $10,000; H. L. Moss, J. C. Keesee; to develop truck mines, shipping via N. & W. R.R.

M. & L. Coal Co., Inc., Sharondale; $25,000; J. F. Loftus, Toller, Ky., J. E. Winslow and L. E. Wren, Williamson, W. Va.; operations in Pike County, Kentucky, and Southern West Virginia.

South Fork Coal Co., Whitley City; $10,000; C. I. Ross, C. C. Walker, others.

The Truck Coal Co., Greenville; $10,000; J. L. and J. F. Mulligan.

Ohio

Snake Hollow Coal & Clay Co., Nelsonville; $60,000; Belford F. Rosser, Clarence Kelley, Frank M. Rosser.

West Virginia

Cochran Fuel Co., Charleston; $25,000; Paul W. Cochran, Ernest Crawford, others.

Davis-Wilson Coal Co., Morgantown; $10,000; R. M. Davis, Charles H. Hayden, Keith E. Gerchow.

DeBoni Coal Co., Morgantown; $25,000; Luigi, Marcella and Lydia DeBoni.

F. & W. Mining Co., Inc., Rupert; $10,000; L. B. Flinton, Jr., Ruth W. Flinton, G. W. Watts.

Haland Coal Co., Princeton; $10,000; George L. Hall, C. E. Anderson, E. T. Hall.

Inner Crescent Coal Co., Inc., Charleston; $100,000; Joe E. Lambert, Charles E. Anderson, Wilson Anderson.

Junior Pocahontas Coal Co., Inc., Goodwill; $25,000; Robert W. Massie, Frank J. Linkous, Jr., Nine B. Linkous, of Bluefield, W. Va.

Kessler, Harford & Sons Coal Co., Summersville; $25,999; S. E., J. E. and M. L. Kessler, of Charmco, W. Va.; holdings in Beech Glen, W. Va.

Randolph Coal Co., Elkins; $10,000; John Solovey, Michael Marykwas, Michael W. Thomas, of Plainesville, Pa.

Rock Creek Mining Co., Sharples; $50,000; D. M. Echols, Chris Holt, of Sharples, and Siegel Workman, of Charleston.

Skygusty-Pocahontas Coal Corp., Skygusty; $10,000; John S. Day, Charles F. Harman, Stewart F. Harman.

Virginia

The Clear Fork Coal Co., Inc.; $50,000; W. D. Sutton, A. S. Glenn, W. H. Mathis; offices in Radford, Va., and holdings in Kopperstown, W. Va.

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Association Activities

Illinois Coal Operators' Association, at its 18th annual meeting at Chicago Jan. 21, elected officers and members of the executive board as follows: President, George F. Campbell; labor commissioner, J. Roy Browning; treasurer, C. W. Peterson; secretary, Fred S. Wilkey; general counsel, Thurlow G. Essington; executive board, Mr. Browning, D. W. Buchanan, D. H. Devonald, George B. Harrington, Hubert H. Howard, E. R. Keeler, T. C. Mullins, T. J. Thomas, A. H. Truax and William P. Young.

CINCINNATI DUPLEX CHAIN

CINCINNATI MINE PUTS THE FINGER ON CUTTING PROBLEMS

FOR over twenty-five years we have made a study of cutting problems and have engineered and developed the finest in cutter chains, bits and bars. The Cincinnati Duplex Chain as well as the Cincinnati Standard Chain is engineered to give maximum efficiency throughout its long life. These chains are constructed to place the stress and wear on easily replaceable long life parts to provide trouble free service. Bit setting and bit hauling time on Mine Sharpened Bits has also been greatly reduced by two types of double-ended, reversible bits . . . the Duplex and the Stanex . . . both are tops for their specific use. Cincinnati Coal Cutting equipment helps you put the finger on cutting problems.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

5 YEARS DEVELOPMENT

ON FIELD TESTS IN EVERY TYPE OF PROSPECTING AND STRIPPING THROUGHOUT THE WORLD.

The Parmanco Single Speed Transmission Drill is designed to meet the requirements of the general prospecting field where it is not necessary to drill in solid limestone. Special sliding frame permits drilling and pulling of augers without moving drill. New design of chuck eliminates all hand operation in raising power plant. Recommended for 50 to 60 feet with four and one-half inch equipment. Under favorable conditions it is being used to greater depths.

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

Operators' Association of Williamson Field, at its annual meeting in Williamson, W. Va., Jan. 30, elected as officers: president, W. W. Walker, president, Majestic Collieries Co.; treasurer, J. D. McLaughlin, president, Earlston Coal Co.; secretary, Joseph J. Ardigo. Visitors addressing the meeting included: Joseph E. Moody, president, Southern Coal Producers' Association; Charles E. Bell, executive secretary, Property Owners' Association, Washington, D. C.; H. B. Lammers, chairman, Coal Producers' Committee for Smoke Abatement; J. E. Garry, secretary, District 8 Coal Association; and J. D. Battle, executive secretary, National Coal Association. The banquet held in the evening was attended by more than 300 persons including many visitors. Fred A. Heintzman, Old Ben Coal Corp., Cincinnati, acted as toastmaster, and an entertainment progrem was presented.

Upper Buchanan Smokeless Coal Operators' Association, in a meeting held in Williamson Jan. 30 following the business session of the Williamson association, elected the following officers: president, C. A. Hamill, president, Sycamore Coal Co.; vice president, J. W. Strickler, president, Page-Pocahontas Coal Corp.; and secretary-treasurer, Joseph J. Ardigo.

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Coal Publications

Investigation of the Slinging Stowing Machine in Coal Mines in the Ruhr District of Germany. Office of Technical Services, PB-80410. U. S. Department of Commerce, Washington 25, D. C. 27 pp. Mimeo. 50c. Description of a machine used to throw and pack waste material into mined-out sections of Ruhr coal mines.

Seventy-Five Years of Progress in the Mineral Industry, Proceedings of the 75th Anniversary of the A.I.M.E., and World Conference of Mineral Resources, 1947, A.I.M.E., Inc. 29 West 39th St., New York 18. 817 pp. 6¼x9¼-in.; cloth, $6. Thirteen historical articles on progress in major branches of the minerals industry, a history of the A.I.M.E. and 16 addresses on resources, technology, economics and political aspects of all major minerals.

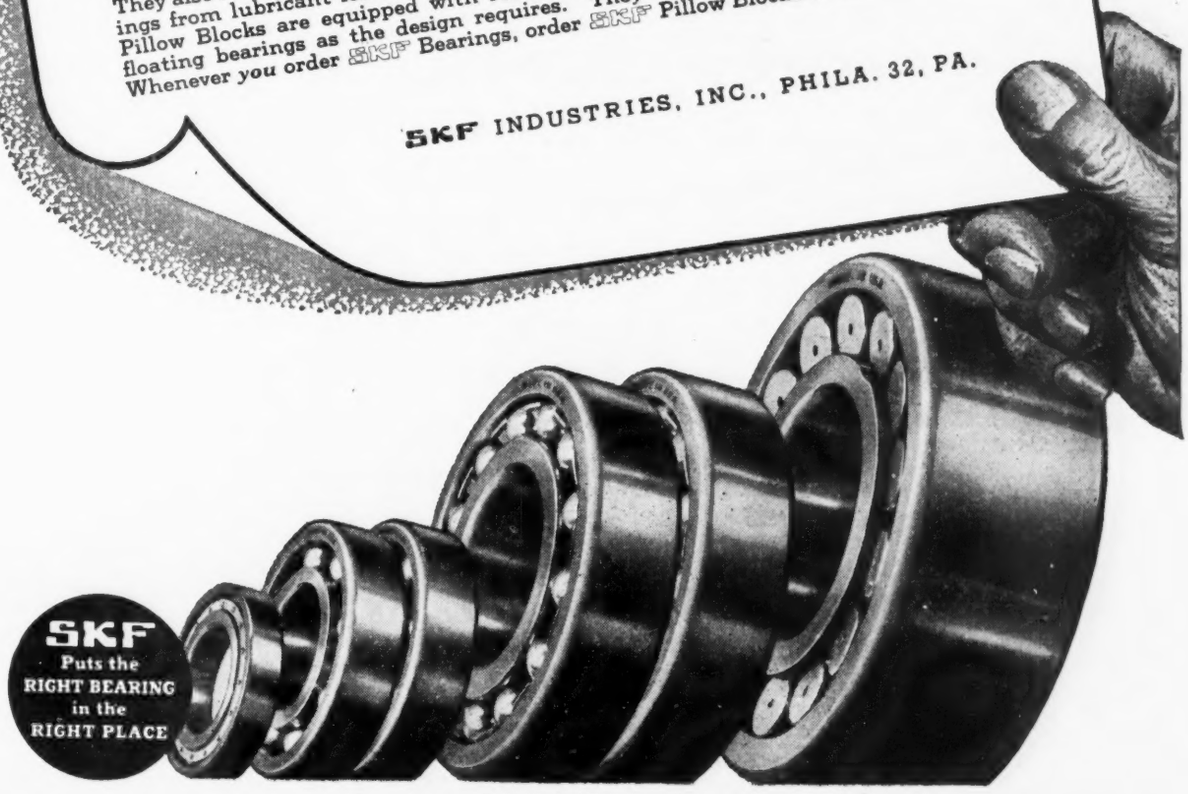
Heating and Ventilating's Engineering Databook, by Clifford Strock. The Industrial Press, 148 Lafayette St., New York 13. 576 pp. 8½x11-in. $7 postpaid in the U. S.; Canadian or overseas postage, 80c. Data in 10 sections: heat and moisture in air, fuels and combustion, piping, air handling and ventilation, heating and heat transmission, cooling and air conditioning, motors and drives, contract law, mathematical data and drafting-room practice, and terminology. Special features on the heat pump, electrothermal storage, snow melting, heating with diesel engines,

• *Built by* AMERICAN PULVERIZER CO.

IT'S A GOOD HABIT

Almost as a matter of standard practice, SKF Bearings went into this "WC" Ring Coal Crusher that's used for reducing run-of-mine coal to stoker and smaller sizes. Having used SKF Bearings for years, engineers of the American Pulverizer Company know how well SKF Bearings accommodate shaft deflections, distortions or weave throughout a long, carefree life at low maintenance costs. They also know how well husky, triple-sealed SKF Pillow Blocks protect the bearings from lubricant leakage and the intrusion of abrasives and corrosives. SKF Pillow Blocks are equipped with removable rings to permit either stabilized or floating bearings as the design requires. They are easy to install and inspect. Whenever you order SKF Bearings, order SKF Pillow Blocks to match. 6414

SKF INDUSTRIES, INC., PHILA. 32, PA.



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Puts the
RIGHT BEARING
in the
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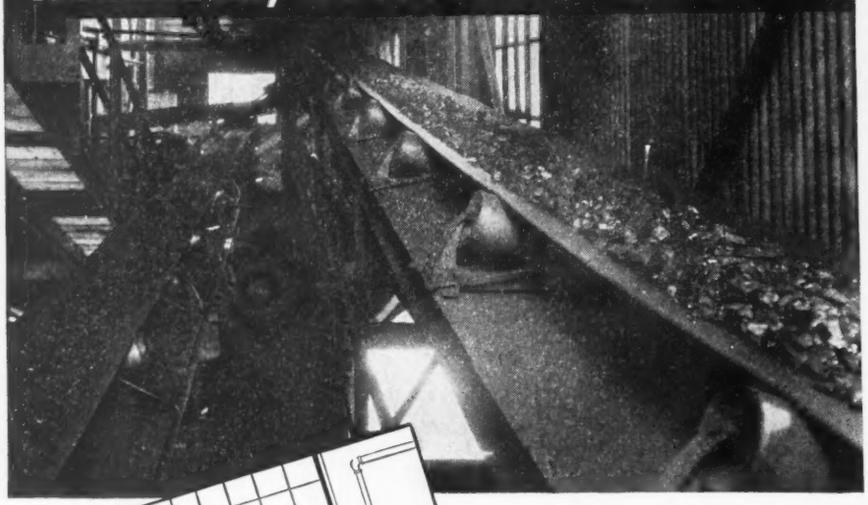
LOOK TO THE *Human Element* IN BELT-BUILDING, FOR THAT RELIABLE, LONG-LIFE QUALITY



The finest materials . . . the most modern machines . . . can't put the punishment-taking *staying* qualities into any conveyor belt. It takes *men* . . . men with knowledge, skill, and that pride of accomplishment which is traditional with Goodall belt-builders.

GOODALL "SSS" CONVEYOR BELTING

The "SSS" stands for super-severe service . . . and years of use on the toughest conveying jobs give ample evidence that the belt is well named.

Specification details are, of course, determined by individual installation requirements . . . above ground or below; but all the factors that contribute to long life and low replacement costs are *there*, regardless of length, width or thickness.

CUSTOM-BUILT BY THE MAKERS OF FAMOUS "MINE KING" AIR HOSE

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solar water heating and radiant (panel) heating. Numerous tables, charts and graphs.

Annual Report of Research and Technologic Work on Coal, Fiscal Year 1947, by A. C. Fieldner and P. M. Ambrose. U. S. Bureau of Mines, Washington 25, D. C., I.C. 7446. 113 pp. plus 51 illustrations. 8x10½-in.; paper; mimeo. Free. Summary of Bureau work on properties of coal, mining methods and practices, preparation, storage, utilization, carbonization, gasification, liquefaction, gas and dust explosions and use of explosives.

Proceedings of the 1947 Smoke Prevention Conference. John Paul Taylor, publisher, 520 Pleasant St., St. Joseph, Mich. 120 pp. plus 17 pp. of illustrations. 8½x11-in.; paper. $2.50. Twenty-one technical and general papers on methods of smoke prevention, covering industrial plants, railroads, etc., with observations of smoke inspectors and air-pollution experts.

Some Studies on Emergency Mine Communications, by E. J. Coggeshall, E. W. Felegy and L. H. Harrington. U. S. Bureau of Mines, Washington 25, D. C., R. I. 4135. 44 pp. plus 13 pp. of illustrations. 8x10½-in.; paper. Free. A progress report that states that no satisfactory method has yet been fully developed but suggests further study of ground conduction and low-frequency radio.

Interrogation of Dr. Otto Roelen of Ruhrchemie A.G. Office of Technical Services, PB-77705. 67 pp. Photostat, $5. Microfilm, $2. Dept. of Commerce, Washington 25, D. C. Development and use of the Fischer-Tropsch process as revealed by the foremost German authority.

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Anthracite Stoker Makers Pledge High Output

Top producers of domestic anthracite stokers, meeting with Anthracite Institute executives in New York City early in February, declared that plans now are under way for sharply increasing stoker output to meet the greatly increased demand due to shortages of other fuels. Stoker company officials agreed that present plant equipment would make a two- to ten-fold increase possible within the next year and Frank W. Earnest Jr., president, the Anthracite Institute, forecast a potential market for over 100,000 stokers in 1948.

Mr. Earnest based his estimate on opinion polls made on the last day of the annual Heating and Ventilating Show in New York City, Feb. 2-6. He pledged full support of the Institute and the anthracite industry to increase equipment sales and cited the Institute's $675,000 advertising campaign as a major help. A like sum will be spent, chiefly in the research laboratory at Wilkes-Barre, Pa., to test and improve anthracite equipment, Mr. Earnest stated.

NEW CHEVROLET
Advance-Design Trucks for 1948

Only Advance-Design Trucks for 1948 Have All These New and Finer Features:

★ **New Chevrolet 4-Speed Synchro-Mesh Truck Transmission** Entirely new Chevrolet developed Synchro-Mesh transmission assures truck users of unparalleled new ease and efficency in truck operation!

★ **New Chevrolet Advance-Design Gearshift Control** Unrivaled new convenience and ease of operation in Advance-Design models with 3-speed transmission. Gearshift is mounted on the steering column to provide new efficiency on every hauling job!

★ **New Foot-Operated Parking Brake** Here's a revolutionary new feature of Advance-Design Models with 3-speed transmission. The new Chevrolet foot-operated parking brake provides safer, more efficient braking, plus new, clear floor area!

★ **New Improved Chevrolet Valve-in-Head Engine** The world's most economical engine for its size—Chevrolet's power-packed valve-in-head engine is now even *finer*, with vital new features that assure greater durability and operating efficiency

★ **New Multiple-Feature Developments** Chevrolet's Advance-Design provides new splined rear axle shaft attachment to wheel hubs for greater strength and durability in heavy-duty models. . . . New heavier, more durable springs. . . . New propeller shaft bearing-seal design . . .

The Newest Line . . . The Greatest Features . . . The Biggest Values!

Here are the nation's biggest truck values —with the *latest* and *greatest* features of advance-engineering! They're new Advance-Design Chevrolet trucks for 1948 —107 models on eight wheelbases—built to deliver *Transportation Unlimited!* See them at your Chevrolet dealer's.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

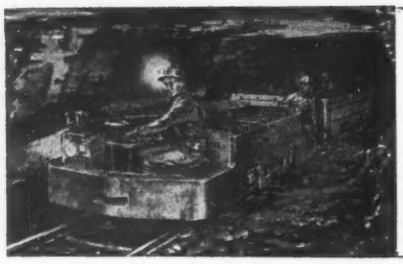
CHEVROLET

. . . PLUS THESE FAMOUS *PROVED* ADVANCE-DESIGN FEATURES:

The Cab that "breathes"* • Flexi-Mounted cab • Uniweld all-steel construction • Large, durable, fully adjustable seat • All-round visibility with rear-corner windows* • Extra-durable frames • Full-floating hypoid rear axles • Specially designed hydraulic truck brakes • Thorough cab-sealing insulation • Standard cab-to-axle-length dimensions permitting interchange of bodies . . . and *MANY* other fine features.

**Fresh air heating and ventilating system and rear-corner windows optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!



Equipment News

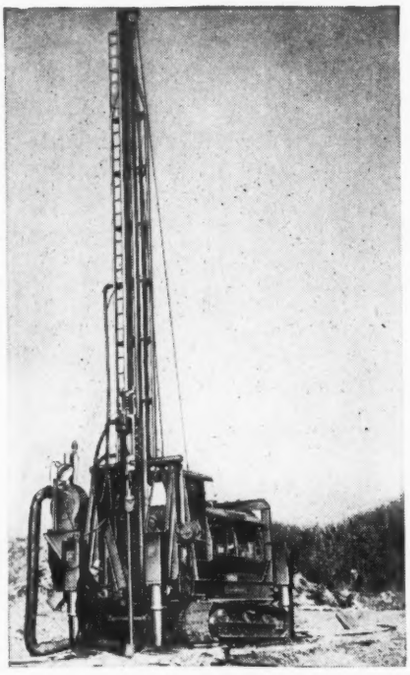
More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Rock Drill

Ingersoll-Rand Co., New York 4, N. Y., announces a new self-propelled rock drill designer for open pit mining and quarry work. Known as the "Quarrymaster," this machine is a completely self-contained unit consisting of a drill, compressor plant, propulsion equipment and accessories. The Quarrymaster, according to Ingersoll-Rand, is capable of drilling at a faster rate than conventional machines generally used in pit and quarry work. It is easily maneuverable, collars a hole with ease, and drills up to 6 in. in diameter and up to 70 ft. in depth.

Mounting an air-operated piston-type rock drill that strikes more than 200 blows per minute, the Quarrymaster has an unusually high rate of rock penetration, the manufacturer states. A patented valve action and power cycle insures maximum efficiency and drilling speed, while maintenance is reduced to a minimum by utilizing a cushion of air to bring the piston to rest before it can strike the front head. Feeding of the drill is accomplished by an air motor that drives the feed chain. A conveniently located throttle permits the operator to exert accurate control over the drill feed, a feature particularly valuable in drilling through slips and seams where a close degree of regulation is necessary. A drill-steel centralizer guides the drill steel until the bit is well-started, permitting quick and easy collaring of holes in the most uneven ground.

Bits used with the Quarrymaster are light in weight, long-wearing, and easily changed, it is stated. In drilling, the bit is automatically rotated by a mechanism that turns it into a fresh cutting position for each blow. The degree of rotation is controlled so that the bit will cut with maximum efficiency. This makes the Quarrymaster a rock-cutting rather than a rock-crushing machine, Ingersoll-Rand declares. Chips are removed by passing compressed air down through the hollow drill steel, forcing the cuttings up to the surface through the space between the steel and the walls of the hole. When the cuttings reach the surface, they are gathered by a motor-operated dust collector. In addition to saving the time which would otherwise be lost in bailing, this method of removing cuttings permits the bit to strike a clean surface with each blow, so that no power is lost in previously-cut material.



Air is supplied by an Ingersoll-Rand KA-500 Mobil-Air compressor mounted on the Quarrymaster frame. It can be furnished with gasoline-engine, oil-engine, or electric-motor drive.

Mounted on generously-sized crawlers powered by Ingersoll-Rand air motors, the Quarrymaster is easily moved from place to place. Extremely sensitive to control, the air motors permit spotting the Quarrymaster in exactly the position desired and are sufficiently powerful to move the entire unit up a 30-percent grade. Four independently controlled hydraulic jacks are used in leveling up the machine, saving up to 15 or 20 percent of the time usually required for conventional machines. Precise leveling is not needed with the Quarrymaster, since the holes drilled do not have to be vertical. The tower of the Quarrymaster is easily raised or lowered by utilizing the power of the feed motor. It can be raised or lowered intact, and the machine can be completely readied for operation in less than hour. An auxiliary hoist is provided for use in raising or lowering the steel and for general utility purposes. Additional features of the Quarrymaster include a sturdy, well-constructed frame and cab in which all controls are centralized.

For additional information, write to Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., or to any branch office, requesting Form 4077.

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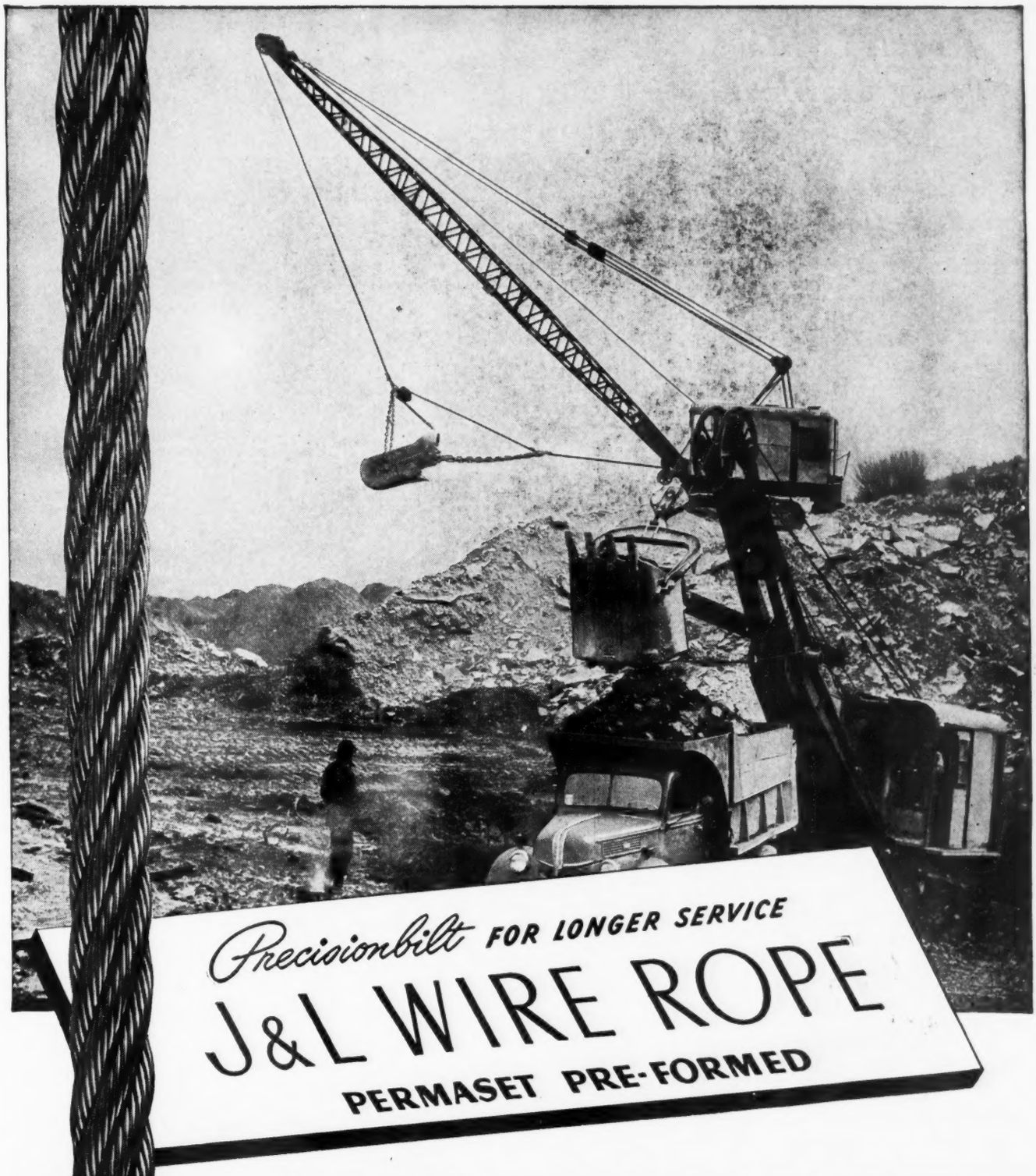
Trucks

Marked progress in driver comfort and mechanical improvements that assure even greater ruggedness and reliability are said to highlight its 1948 trucks and commercial cars, according to the Chevrolet Motor Division, Detroit 2. The new Chevrolet truck line totals 107 different models on eight wheel bases, blanketing the light-, medium- and heavy-duty fields. Both conventional and cab-over-engine types are offered. Payload ratings go as high as 10,500 lb.

Features cited by the manufacturer range from such important innovations as four-speed synchro-mesh transmissions and standardization of the gearshift lever on the steering column to engine and chassis refine-



J&L STEEL

Dragline and shovel operators reduce down-time on their equipment by use of J&L Precisionbilt Wire Rope. Its extra dependability keeps their equipment on the job, reduces maintenance costs.

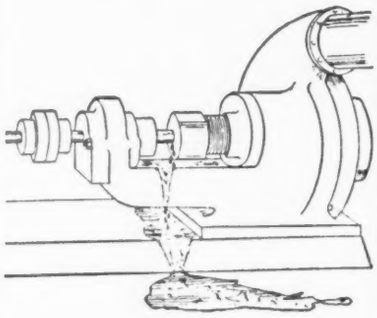
JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

Troubled With Leaky Stuffing Boxes on Your Pumps?

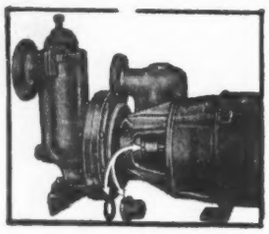


Try SYNTRON

"Replacement"

SHAFT SEALS

the next time!



Self-lubricating "Packaged" units (no conglomeration of parts to fuss with) —easy to install, just slide over shaft and secure.

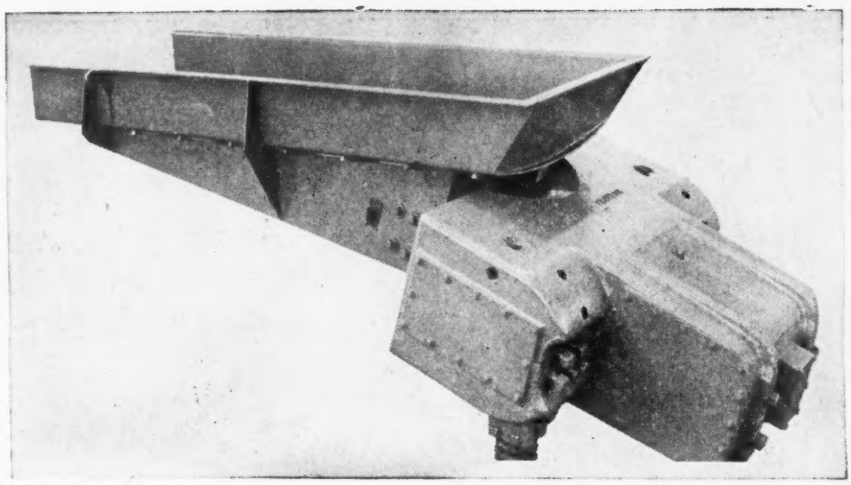
For handling water, air, gases, petroleum products, etc.

Withstand temperatures from —10° F. to +200° F., and pressures to 250 psi.

Write for folder.

SYNTRON CO.

975 Lexington, Homer City, Pa.



Vibrating Feeder

The Jeffrey Mfg. Co., Jeffrey-Traylor Division, Columbus 16, Ohio, has announced an electric vibrating feeder with a newly designed inclosed power unit said to have been especially designed for use where the material to be handled is magnetic, hot, dusty and abrasive.

In the past, the company points out, such installations have been affected by hot magnetic dust sifting down on the open magnetic motor of the vibrating feeder or conveyor and causing serious damage to the coils and pole faces. This new inclosed vibratory power unit is said to remove these operating hazards because it is entirely dust tight and, in addition, also is provided with air inlet and outlet features so that a stream of air may be circulated through the motor to build up, if necessary, a slight internal pressure in the motor.

Another new feature of the power unit, according to Jeffrey, is an adjustable support, which permits changing the slope of the feeder from 5 deg. up-grade to 15 deg. down-grade, by merely loosening four cap screws on the support and raising or lowering the deck end.

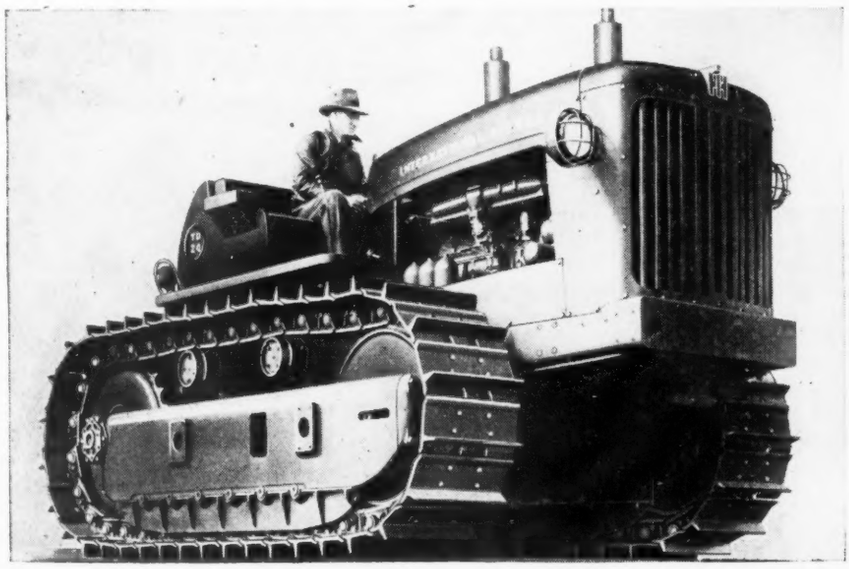
ments. In considering adaptation of the synchro-mesh transmission gears to heavy-duty models as one of the most significant truck developments in years, the company points out that to owners synchro-mesh promises reduced wear, less lost time and lower maintenance costs; and to the driver less driving strain, easier shifts and quicker acceleration in emergencies. The steering-column-mounted gearshift will be standard equipment on all models with payloads up to 2,100 lb. Parking brakes are now foot-operated.

Two engines power the 1948 truck series. Designated as the "Load-Master" and the "Thrift-Master," these motors incorporate many changes, the company says. Life of the engine bearings, it is said, has been more than doubled. Crankshafts are heavier and more rigid. Main bearings are new, precision-built and interchangeable. Bearing caps have been redesigned to resist deflection.

•

Tractor, Diesel Engines

Production of two new six-cylinder diesel engines, Models UD-16 and



TESTS GIVE RUBBER A GOOD GRIP ON LIFE

The tight adhesion of rubber-to-fabric is an important factor in the long-lasting quality of belting, hose, packings. That's why Quaker technicians are constantly making adhesion tests after samples of rubber and fabric are "welded" by miniature calenders shown above, to assure a tight union.

This is only one of eighteen rigid tests that raw materials and finished products *must* pass before receiving the Quaker stamp of approval. Yes—pre-testing provides quality and long service . . . assures worthwhile dividends for you through higher plant efficiency, lower operating costs.

Call your nearest Quaker distributor for speedy service. He and the Quaker sales engineer are teamed to provide accurate recommendations on Quaker pre-tested belting, hose, packings.

QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • New York 7 • Cleveland 15 • Chicago 16 • Houston 1
Western Territory
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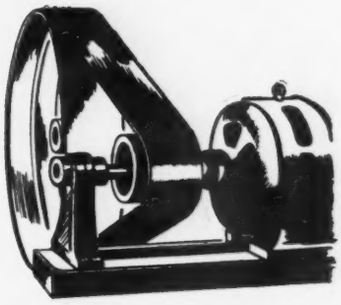
QUAKER RUBBER PRODUCTS

custom made for every industrial use

PRE-TESTING PAYS OFF WITH PEAK SERVICE

Check these pre-tested and proved Quaker products that help reduce operating costs for industries everywhere.

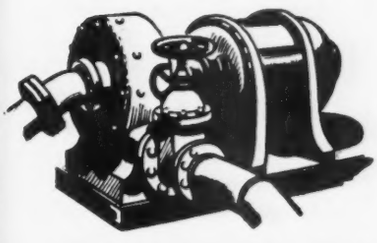


MORE POWER FOR PRODUCTION

In the complete line of Quaker transmission belts and belting pre-testing plays a vital part in providing long service, tight grip, slip-less power. Both V and flat types . . . transmission and conveyor, for all purposes.

STANDS PRESSURE, RESISTS WEAR

Quaker hose, in moulded and wrapped construction, is ruggedly built of pre-tested materials for trouble-free transmission of air, steam, water, acids, volatiles. Tight adhesion of rubber and fabric resists pressure, twisting, severe wear.



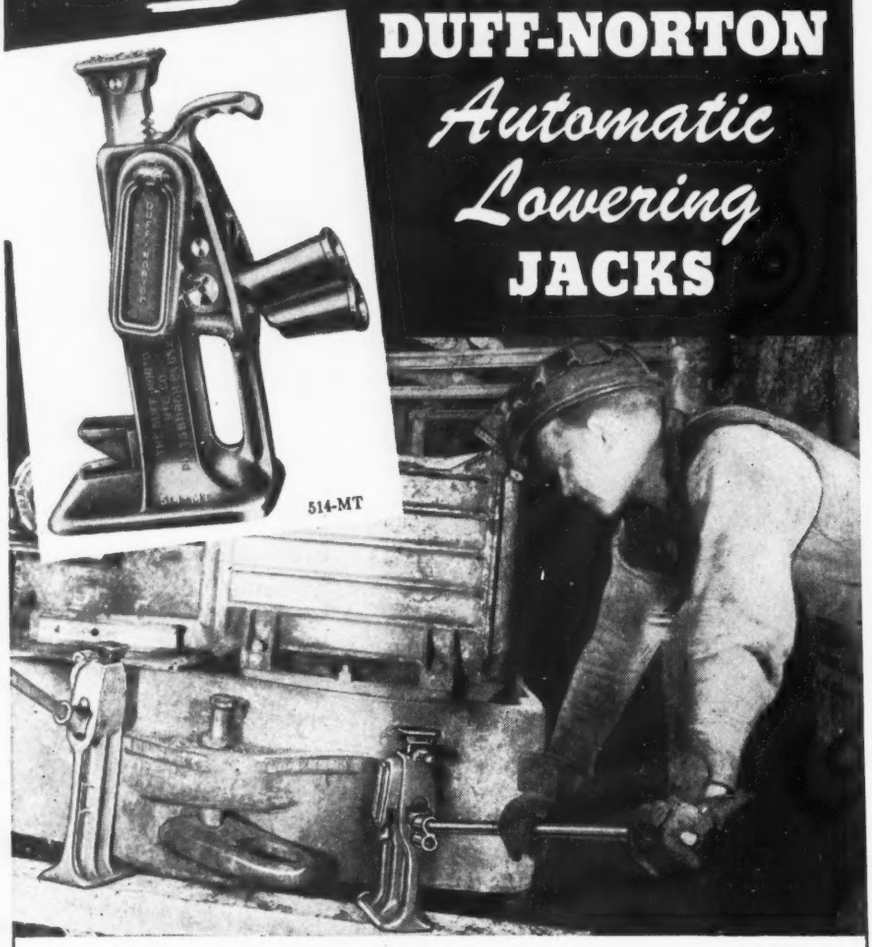
STOPS LEAKS . . . CUTS COSTS

Quaker pre-tested packings for all purposes stop hot leaks cold . . . provide tight-sealing, long lasting service for valves, piston rods, flanges. Ideal for packing against steam, water, acids, volatiles. Call Quaker for solution to your packing problems.

FOR *Fast* RERAILING OF MINE CARS

DUFF-NORTON

Automatic Lowering **JACKS**



Also for Many Other Heavy Lifting and Lowering Jobs

Rerailing of mine locomotives and cars, bracing of cutting and loading machines, maintenance of track and general shop repair work—are some of the unlimited uses of the Duff-Norton 5 ton Automatic Lowering Jack illustrated above. Your mine should have several of these handy jacks available for all emergency and regular repair jobs.

DUFF-NORTON MINE ROOF JACKS

For Cross Timbering-Mine Roof Support and Protection of Working Face Areas

Duff-Norton Mine Roof Jacks are designed and built for quick, easy and safe operation. Heavy rigid center columns insure full capacity and complete safety. They serve as sturdy supports until permanent timbering is in place. Write for complete data.

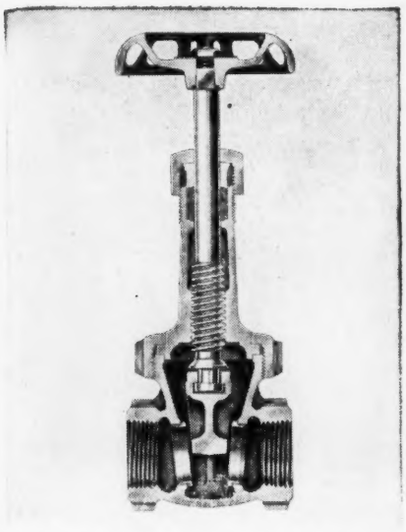
65th Anniversary

See Your Local Industrial Distributor

THE **DUFF-NORTON** MANUFACTURING CO.

"The House that Jacks Built" • PITTSBURGH 30, PA.

THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS

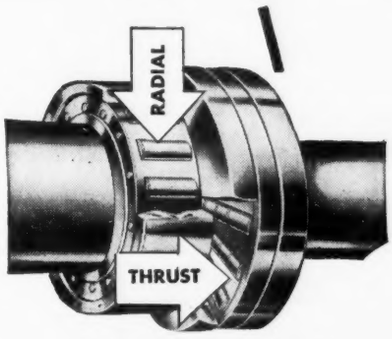


VALVE—Bronze gate valve for 200-lb. service, Fig. 270-U, developed by Jenkins Bros., New York 13, is available in sizes 1/4 to 2 in. With the newly designed seating combination—a high-tensile-strength bronze wedge seating against monel-metal seat rings that have a hardness about 2½ times that of valve body bronze—wear is reportedly taken by the most accessible and inexpensive part, the bronze wedge.

UD-24, and the International TD-24 crawler tractor incorporating the UD-24 diesel engine, has been announced by International Harvester Co., Chicago 1. The TB-24 tractor (illustrated), weighing 36,275 lb. without fuel, water or attachments, and supplying 180 flywheel-horsepower and 140 drawbar-horsepower, is called by the manufacturer "the most powerful crawler tractor on the market." The tractor reportedly is entirely new, including its 6-cylinder, 4-cycle, 180-hp. diesel engine and is said to offer cost-cutting power for big projects, with high-speed operation as well as tremendous pull.

Among the features cited by the manufacturer are: push-button all-weather starting with the International in-built gasoline-conversion starting system; tip-toe engine-clutch control, hydraulically boosted; eight speeds forward and eight speeds reverse, with a speed range from 1.6 to 7.8 m.p.h.; easy, on-the-go gear shifting with synchro-mesh transmission and instant high-low range shift; quick forward-reverse shift in any traveling speed by means of separate shift lever; planet-power steering under finger-tip control with a new hydraulic system, permitting gradual turns with both tracks pulling or pivot turns with one track locked and the other track under full power; new track frame assembly with taper roller bearings in track rollers and front idlers, new-type idler recoil spring and one-piece welded track frame; ease and convenience for operator, with roomy comfortable seat, centrally located controls and unexcelled visibility; provision for easy

Handles Heavier THRUST LOADS Reduces Shut-Downs



For Combined Radial and Thrust Loads

Right Angle Loading splits every load into components of pure radial and pure thrust. Thus, where combined loads are involved, a Rollway Radial Bearing takes the radial load . . . a Rollway Thrust Bearing takes the thrust load.

FREE SERVICE—Send us your designs for bearing analysis and recommendations.

Rollway Right Angle Loaded Bearings eliminate oblique loads on the rollers . . . prevent compound loads from piling up . . . provide greater resistance to shock.

Hence, Rollway Thrust Bearings, designed for *thrust only*, carry heavier loads with less roller end-rub . . . with less roller wear-back . . . without roller pinch-out. Result: lower maintenance, fewer shut-downs, and less replacements.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

ROLLWAY
RIGHT-ANGLE LOADED
BEARINGS

OFFICES IN: PHILADELPHIA • BOSTON • PITTSBURGH • CLEVELAND • DETROIT
CHICAGO • MINNEAPOLIS • BIRMINGHAM • HOUSTON • LOS ANGELES

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Insulating Tape
has all these 7 Features

1 Double grip . . . both sides adhesive.
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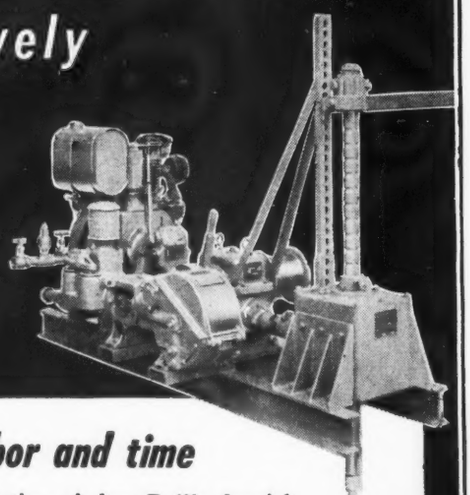
for instance in STRIP MINING

Know Positively
DEPTH of overburden
THICKNESS and quality of COAL SEAM



for least cost, labor and time

Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears.. Sturdy. Few parts . . . ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

MODEL LD

ACKER DRILL CO., SCRANTON 3, PA.

ACKER ROTARY CORE DRILLS

mounting of allied equipment; accessibility when service is necessary through unit construction and easily reached assemblies; needle bearing universal joint compensating for any misalignment and permitting mounting of heavy equipment on the front; all-steel welded main frame with heavy box-section front frame for mounted equipment. A complete line of matched tractor equipment is available for the TD-24.

The new UD-24 diesel engine has a 1,090-cu.in. piston displacement with a 5¾x7-in. bore and stroke and develops 191 hp. at 1,375 r.p.m. The UD-24 power unit, equipped with radiator, fan, clutch and power take-off, develops 180 hp. at 1,375 r.p.m.

Features of the engine reported by the manufacturer include: four-cycle design that contributes to simplicity of engine operation and maintenance; new International twin-plunger fuel-injection pump especially designed for smooth engine operation, good governed speed regulation, superior lugging ability and minimum fuel consumption; IH precombustion chamber that permits efficient use of low-cost fuels, such as No. 3 fuel oil; location of exhaust and intake manifolds on opposite sides of the engine to assure maximum power and long valve and piston life by providing free flow of intake air and exhaust gases. The UD-24 operates on ordinary lubricating oil without the need of oil coolers.

The second engine announced is the six-cylinder 100-hp. UD-16, which has a 501-cu.in. piston displacement and 4.4x5.5-in. bore and stroke. The engine develops 103 hp. at 1,800 r.p.m. and, when equipped with radiator, fan clutch and power take-off, delivers 100 hp. at 1,800 r.p.m.

Since the UD-16 is a precombustion chamber type of diesel, smooth idling and maximum power with clean exhaust result on a wide variety of low-cost fuels, including No. 3 fuel oil, according to the manufacturer. Many of the features of the larger UD-24 engine also are available in the UD-16 unit.

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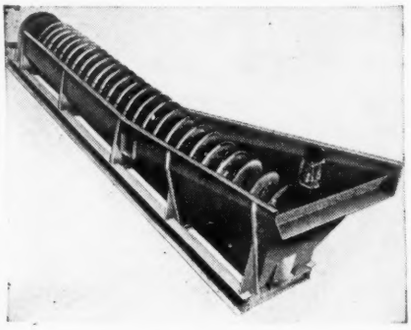
Classifier

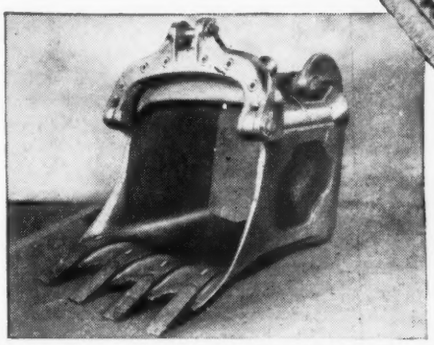
The new Wemco "S-H" (Special Helix) classifier, according to the manufacturer, the Western Machinery Co., San Francisco, introduces many new improvements and, although one size smaller in diameter than other



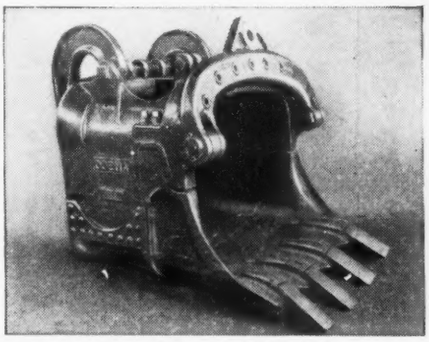
WHEN A BIG BITE.....

isn't bad manners

An Amsco 2-yard All-Manganese-Steel Welded Type Dipper gulps up a king-sized chunk of sandstone on a West Virginia airport job.



The Amsco All-Manganese-Steel Welded Type Dipper. Plug-welding of overlapping, rabbeted castings gives strength with minimum weight.



The Amsco All-Manganese-Steel Renewable Lip Dipper. Extra ruggedness throughout plus a quickly removable and renewable lip unit.

There's no etiquette involved when power shovel dippers dig into the job at hand—the bigger the bite the faster the pace set for the operations which follow. Designed to move more material every shift and with the stamina to keep delivering bigger payloads hour after hour, Amsco dippers undercut job estimates with maximum production and minimum maintenance.

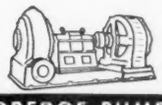
Sharp, widely-spaced teeth are "fanned" slightly for scooplike, full bite of material. Lip is smoothly contoured with curved, easy-penetrating sides. Interiors are smooth to prevent clay building or arching of material . . . tight-fitting parts eliminate crevices and pockets where material can collect. The four-way taper out to door assures immediate discharge of entire load . . . latches hold securely; release instantly. The result: fast, full loading with minimum "crowd" and quick, complete dumping.

Manganese steel is used throughout to give these dippers even greater efficiency and service life. The more you abuse it the harder and more highly polished the surface becomes to fight abrasive wear and improve penetration and dumping. While the body metal remains "the toughest steel known" to counteract the severest stresses, the surface work-hardens under impact to as high as 550 Brinell. Send today for Bulletin 547-DS.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.



MANGANESE STEEL CASTINGS
"CHROME-MOLY" STEEL CASTINGS
HARDFACING ELECTRODES
GRINDING MILL PARTS

DIPPERS DREDGE PUMPS CRUSHER PARTS SOLIDS PUMPS BUCKETS WHEELS

COAL COMES OUT FASTER

"FEMCO" trolleyphones make possible instant voice contact with haulage or gathering locomotives anywhere in the mine . . . eliminates delay, helps move coal faster and permits efficient distribution of empty cars. One operator reported savings of $40 to $50 a day with this system! Write for complete information today!

FEMCO

WHEN CARS AND LOCOMOTIVES ARE DISPATCHED WITH TROLLEYPHONE

FARMERS ENGINEERING & MFG. CO.
549 BRUSHTON AVE. PITTSBURGH 21, PA.

A New Locomotive Backed by 25 Years' Experience in the Battery Locomotive field!

GREENSBURG
"RANGER" STORAGE BATTERY
LOCOMOTIVES

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons — either single or double motor drive — 16" to 56½" track gauge.

All Locomotives CUSTOM-BUILT to your requirements

FEATURES

Oil-tight, leak-proof transmission. Use regular auto oil; change every 6 months.

Strong. Simple. Low maintenance cost.

Extra-long journal springs assure better trackability.

Large motor, to assure more horse power per ton weight of locomotive.

Can be equipped with hydraulic brake.

MORE HAULING FOR LESS STORAGE BATTERY CAPACITY

THE GREENSBURG MACHINE CO.
Makers of Custom-Built Storage Battery Locomotives
101 STANTON ST., GREENSBURG, PA.

units, can do exactly the same job at lower initial cost and lower operating cost. Design features of the unit are said to include the new Special Helix, new shaft design, new tank design, new lifting mechanism, new drive arrangement, and new main bearings.

Perhaps the most significant of the new Wemco features, according to the manufacturer, is the development of the Special Helix ("S-H"). By increasing spiral pitch in relation to the spiral diameter, a third flight or ribbon has been adapted to the spiral design. This improvement has several operating advantages over previous types and permits the machine to do a given job at lower speed than other-type machines. Consequently, the "S-H" machine requires less horsepower, involves less wear and causes less pool agitation, it is said.

In summary, the manufacturer outlines advantages of the new unit as follows: (1) the Wemco "S-H" Classifier required to do a given job is a size smaller than any other-type unit necessary; (2) triple pitch and a longer pool area provide better effective separation; (3) operating cost is reduced because of lower horsepower requirements; (4) maintenance cost is reduced because of less wear and a simplified drive.

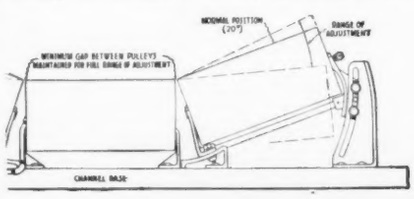
The unit is manufactured in a variety of sizes of from 16 to 78 in. in diameter, inclusive. Several tank lengths are available for each size in either straight or flared design, depending upon requirements. Simplex and duplex machines also are available.

•

Troughing Idler

A new adjustable troughing idler said to materially increase conveyor belt life has been announced by Koppers Co., Inc., Pittsburgh 19, Pa. Outer inclined pulleys of the unit are adjustable from slightly above the horizontal up to an angle of 25 deg. All idler pulleys are located in the same vertical plane and the adjustment of the outer pulleys is accomplished so that a constant gap is maintained between the ends of the horizontal and inclined pulleys.

With this new design it is possible to practically tailor-make the idler installation to fit the conveyor belt, with any suitable depth of trough required, the company says. This adjustable idler is said to be particularly suited for use where an inclined belt changes to horizontal and spillage often is a problem. The adjustable idlers can be used to form a vertical curve at such points, thus providing as shallow a trough depth as



"PANORAM"

...an inspired name for a wide-vision

SAFETY GOGGLE

...and this AO Product is better than its Name!

This popular plastic goggle pleases both the worker who seeks sure protection *over* his prescription glasses and the man who needs protective goggles *only*. The *replaceable* lenses provide full, wide-angle vision and with the lightweight frames, may be had either clear or in green acetate. There's overall comfort in frames closely conforming to forehead and face . . . a bridge which fits any nose without irritation or pressure . . . eyecups vented to reduce fogging of lenses. Your nearest MSA Representative can give you full information about the Panoram Goggle for combating hazards common to chipping, grinding, riveting and similar operations.

American Optical COMPANY *Safety Division*

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

Investigate

this MODERN Core-Drilling Machine

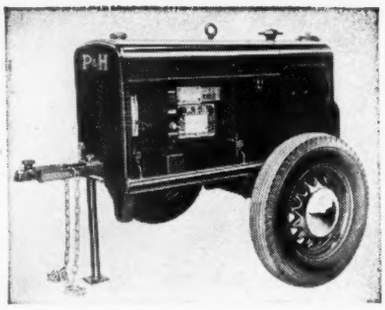
Bortz **DIAMOND BITS** are also manufactured by Sprague & Henwood. Full details sent upon request.

It's Engineered to Meet Your Most Severe Demands

Sprague & Henwood Core Drilling Machines are modern in every respect . . . Can EASILY perform the work expected of them! That's because they are built to meet the demand of present day core drilling work! The machines are high speed, exceptionally sturdy, constructed to withstand rugged service. Available with two distinct types of feeds. "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.

SPRAGUE & HENWOOD, INC.

Dept. K **SCRANTON, PA., U. S. A.**



EXTRA POWER SUPPLY of its Model WN-200 portable arc welder, recently announced by Harnischfeger Corp., Milwaukee 14, is offered as optional equipment at small additional cost and provides 1½ kw. a.c. at 115 volts, single-phase, thus permitting hook-up of floodlights and various electric power tools while welding.

necessary to retain the material without spillage and eliminating excessive belt stretch at the edges. The use of the adjustable idlers at the feed and discharge ends of belt conveyors also will permit the belt to be troughed or flattened gradually, which will reduce the strain on the belt, with elimination of the abrupt distortion of belt when entering or leaving the idlers, it is said.

•

Roller Bearings

The Timken Roller Bearing Co., Canton 6, Ohio, has announced a 25 percent increase in the radial and thrust load carrying capacities of its complete line of tapered roller bearings, following a 10-year study in its physical laboratory and in the field.

The increase, according to the company, is based on several factors, including improved alloy steels made specifically for anti-friction bearings; better metallurgical control; more accurate manufacturing equipment; greatly improved surface finishes; and more accurate inspection methods. Bearing performance continually checked in the laboratory, plus the observed performance of bearings operating in various equipment, is said to fully justify the increased ratings. The new ratings will enable design engineers throughout all industry to effect important savings in new designs, not only in bearing costs but in surrounding mechanisms as well, it is reported.

•

Trade Literature
Available Without Charge on Request to the Manufacturer

Rubber Products—Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. Sixth Edition of "Manhattan Rubber Products for Industry," a condensed catalog of mechanical rubber goods, describes many mechanical rubber products and spe-

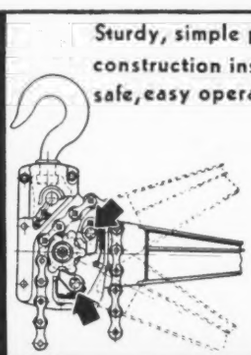
Extra SAFETY... *Extra* DURABILITY
...*Extra* OPERATING EASE...
WITH
COFFING
SAFETY-PULL HOISTS

Safety Pull Hoist Tightening Mine Trolley

Check these features that give longer hoist life, greater ease of operation—

- Hooks of drop forged heat treated steel
- Reversible handle permits operation in any position
- "Safety Load" handle—bends before other parts will break
- Each model pre-tested to 100% overload
- Coffing exclusive dual ratchet and pawl assembly for maximum safety
- Nine models in capacities from ¾ to 15 tons

Sturdy, simple pawl construction insures safe, easy operation.



Write for Bulletin RL-3

COFFING HOIST CO.
DANVILLE • ILLINOIS

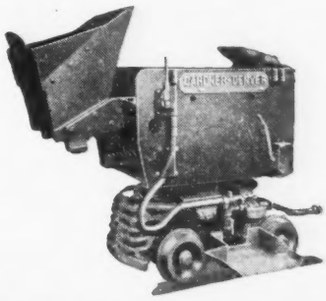
RATCHET LEVER HOISTS • LOAD BINDERS • SPUR GEAR HOISTS • ELECTRIC HOISTS • DIFFERENTIAL HOISTS TROLLEYS

TEAMMATES FOR TONNAGE

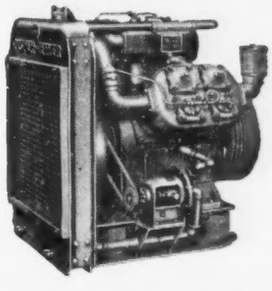
Teamwork between men and equipment gets coal out faster—at less cost. And when you use Gardner-Denver Rock Drills, Compressors and Loaders, you are sure of the *right* teammates for the job. Backed by nearly ninety years of manufacturing experience, these Gardner-Denver machines are your assurance of better mechanization for increasing tonnage.

The new lightweight Gardner-Denver R94 Self-Rotating Stoper—weighing only 100 pounds—combines high drilling speed with powerful 4-pawl rotation. A fine balance is maintained between drilling speed and power of feed. Held in any position, this drill will not "nose dive."

A fast, powerful drill, the 31-pound Gardner-Denver S33 Sinker is light enough for work in places difficult to reach. Ruggedly built for tough service, the S33 is an easy riding drill with exceptional hole cleaning ability.



Two 5-cylinder radial air motors—functioning together—give this "Big Bite" GD14 Mine Car Loader extra power on the crowd. Adjustable swing stops assure a wide clean-up range. Extremely low center of gravity gives maximum stability on the tracks—no matter how big the "bite."

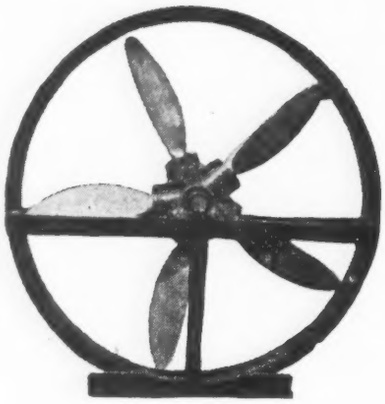


Remarkably compact, Gardner-Denver "WB" Vertical Water-Cooled Two-Stage Compressors have an air output comparable to that of large horizontal compressors. Two small water-cooled cylinders—instead of a single large one—produce lower air temperatures . . . reduce inertia loads.

For complete information, write Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER SINCE 1859

GUYAN



Made in 4 sizes:
36", 48', 60" and 72".

VENTA-MINE

All have cast aluminum blades — 60" and 72" sizes have adjustable pitch.

FANS

Write for GUYAN Catalog

GUYAN MACHINERY CO. LOGAN, WEST VA.

THE WAY TO BEARING ECONOMY

PROMET THE Engineered BRONZE

A SPECIFIC FORMULA FOR EACH APPLICATION

AXLE BEARINGS
JOURNAL LINERS
BUSHINGS
WEARING PARTS *for*

GENERAL ELECTRIC
GOODMAN
WESTINGHOUSE
SULLIVAN
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JOY
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JEFFREY
EQUIPMENT

Write for Free Folder

THE AMERICAN CRUCIBLE PRODUCTS CO., 1307 Oberlin Ave., Lorain, Ohio, U. S. A.
Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. VA., The Universal Supply Co. 1207 S. Kanawha St. . . . . Phone 7307
LORAIN, OHIO, The American Crucible Products Co. Phone 6983

Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave. . Phone 3-8624
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MT. LEBANON, PA., J. E. Nieser 720 Roselawn Ave. . . . . Phone LE-9876
KERMIT, W. VA., Controller Block & Supply Co., Inc. . . . . Phone 301
WILLIAMSON, W. VA., Williamson Supply Co. . Phone 1200

cial items manufactured by Manhattan Rubber, with particular emphasis on transmission and conveyor belting, V-belts, hose, engineered molded products rubber roll coverings, tank linings and abrasive wheels.

Electric Cable — Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass. Catalog covering the entire line of standard Simplex-TIREX portable cords and cables, in addition to giving usual weights and dimensions, contains a description of the Simplex "Cured-in-Lead" process. Complete information on splicing also is provided.

Trucks—The Euclid Road Machinery Co., Cleveland 17, Ohio. Folder No. 217 covers the construction, specifications, features and application of the Euclid 40-ton bottom-dump "Coal Hauler," the latest addition to the Euclid line of self-powered hauling equipment, which is powered by a 275-hp. diesel engine with a top speed of 31.2 m.p.h. with an 80,000-lb. payload.

Wire Rope—Macwhyte Co., Kenosha, Wis. Booklet No. 48-1 shows pictorially the various steps in manufacturing wire rope and illustrates the processes involved, from the wire rods right through the wire and rope mills.

Gas Welding Wire—Page Steel & Wire Division, American Chain & Cable Co., Inc., Bridgeport 2, Conn. Catalog devoted exclusively to gas welding wire and its use covers the complete Page line, along with the application, procedure, proper torch adjustment, physical properties, etc., of each rod.

Freezeproofing Coal—Calcium Chloride Assn., 1028 Connecticut Ave, N.W., Washington 6, D. C. Information Bulletin No. CoB-1 outlines general instructions, quantities required and procedure in utilizing calcium chloride for freezeproofing coal.

Electrical Connectors—Mines Equipment Co., Clayton Ave., St. Louis 10, Mo. Catalog No. 105 illustrates and lists the company's line of molded rubber connectors and receptacles. Sizes, specifications and prices are included.

Cable Vulcanizers—Mines Equipment Co., Clayton Ave., St. Louis 10, Mo. Bulletin No. RV106 illustrates and describes the company's models of electrically heated cable vulcanizers and also lists the styles and specifications of the molds available for use with the units.

Coal Preparation — McNally Pittsburg Mfg. Corp., Pittsburg, Kan. Bulletin No. 216 describes and illustrates four coal-cleaning systems and includes explanatory circuits, illustrations of machines and diagrams of operation. Features, operation and results of the systems are thoroughly explained.

Iron Castings — McNally Pittsburg Foundries, Inc., Pittsburg, Kan. Bulletin No. 1115 illustrates and describes the steps in foundry casting, the methods and controls employed and the services offered by the company. Analytical data on process cast iron and a specification summary on iron castings are included.

Electrical Equipment—Federal Electric Products Co., 50 Paris St., Newark 5, N. J. Latest edition of the "Federalog" is an illustrated catalog of the Federal line and includes specifications data, etc., on Federal's newest motor controls, safety switches, service equipment, circuit breakers, panelboards, switchboards and bus duct.

Metal Spraying—Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y. Bulletin No. 57 outlines the use and advantages of Metco Sprabond, a metal that may be sprayed directly onto smooth, even highly polished, steel and many other materials without surface preparation.

Roller Bearings—Link-Belt Co., Ball & Roller Bearing Division, 519 North Holmes Ave., Indianapolis 6, Ind. Booklet No. 2196 describes the Link-Belt "DE" radial-thrust, self-contained,

Your Everyday Piping Needs Now Filled from Local Stocks

No waiting for most regular items at your Crane Branch or Wholesaler

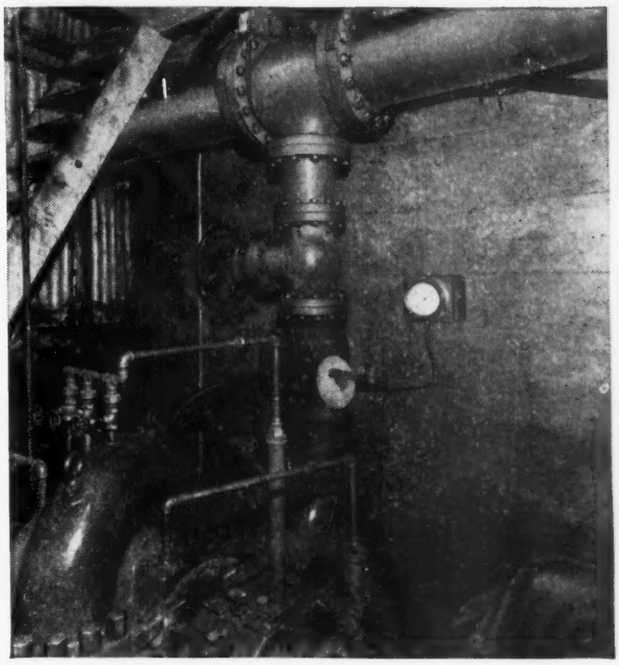
Stock bins are rapidly filling up at local Crane outlets. Day by day . . . in valves, fittings, steam specialties, and accessories . . . brass, iron, and steel . . . the selection keeps rounding out.

For routine maintenance work or emergency replacements . . . below or above ground . . . you're most likely to get what you need . . . when you need it . . . in the complete Crane line. Because in power, processing, or general service piping equipment, the Crane line is *most* complete. And because, in performance and value, Crane quality has always led the field.

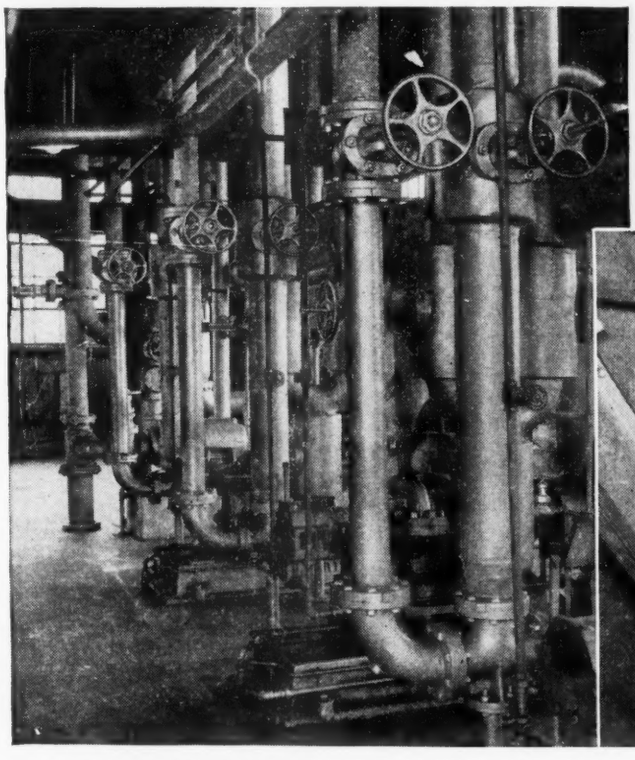
You'll avoid needless delays by calling your Crane Man first for everything in piping.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

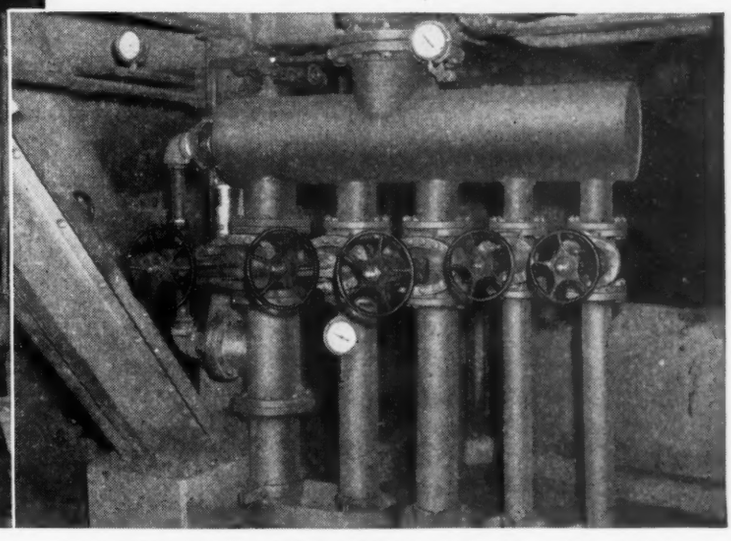
ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



LIFTING WATER 1960 FEET *through a Crane-equipped piping system featuring 250-pound iron valves and fittings.*



A LARGE BREAKER PLANT'S *power house showing boiler feed piping, equipped from the complete Crane line.*



MANIFOLD TO PEA AND BUCK CONE *in breaker plant; also to agitator rings and classifier. One order to Crane gets all the piping materials.*

EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

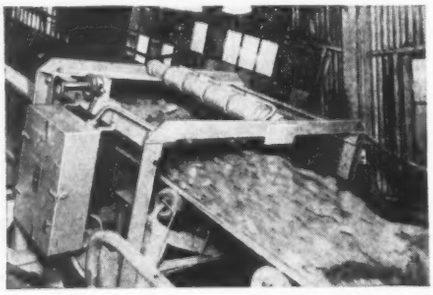
CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

TRAMP IRON DETECTED and HALTED!

Installation of a DINGS MAGNETIC DETECTOR in conjunction with your conveyor belt is a simple . . . economical . . . efficient method of detecting tramp iron before it can cause damage to your machinery and screens and to your customers' stokers. Detector can be set to sound horn or stop conveyor . . . or both. Magnetic objects as small as 0.2 cu. in. are detected over entire belt width. Efficient even with *high belt speeds and heavy loads* . . . and not affected by vibration. Simple construction . . . easily and quickly installed . . . for belt widths from 18 to 60 inches and over. Watertight coils available for installation outdoors.



A typical installation of a Dings Magnetic Detector on a fast-moving conveyor belt. Iron passing the detector sounds an alarm and stops the belt.

Dings makes a complete line of magnetic separators, including: electro-pulleys, Perma-pulleys, rectangular spout magnets, rectangular suspended magnets, demagnetizers, sink float separators for use in heavy media separation plants. Write for details of how Dings magnets can solve your specific problems.

DINGS MAGNETIC SEPARATOR CO.
4720 W. McGeogh Ave., Milwaukee 14, Wis.
Separation Headquarters Since 1899

Dings
"HIGH INTENSITY"

preadjusted roller bearings, which are of the angular contact (radial-thrust) type, with concave rollers operating between convex raceways. Dimensions, weights, bearing capacities at given revolutions per minute, shaft fit tolerances, housing fit tolerances and the necessary data for calculating the required bearing capacity are included.

Roof Maintenance—Stonhard Co., 403 North Broad St., Philadelphia 8. Folder describes use of Stonhard Roof Resurfacer to stop leaks and maintain roofs and also notes danger signs that lead to roof failure and the vulnerable points where special attention is most often required.

Mercury Vapor Lamps — Westinghouse Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J. Bulletin No. A-5112 describes 16 types of mercury-vapor lamps and contains detailed information on electric discharge through vaporized mercury; technical data; spectral radiation characteristics of vapor lamps; lamp construction; lamp life and lumen maintenance; effect of ambient and lamp temperatures on lamp life; and application information.

Synthetic Rubber—I. E. duPont de Nemours & Co., Inc., Wilmington, Del. "Neoprene Notebook, No. 39," contains information on laboratory results and industrial application, for neoprene cable, wire rope and other equipment. This publication is issued quarterly and covers various applications of neoprene.

Machine Guard—Flohr Safety Equipment, Inc., Buffalo 17, N. Y. Bulletin provides details of the new Flohr automatic radial guard for use on grinding wheels, wire brushes and buffers.

Flexible Couplings — Dodge Mfg. Corp., Mishawaka, Ind. Bulletin A-410 describes the construction and features of a new pin-type flexible coupling incorporating the "Taper-Lock" bushing used successfully with V-belt sheaves. The use of this bushing not only insures fastening to shaft with firmness of a shrunk-on fit but also makes reboring unnecessary, according to the company.

•

Industrial Notes

Jeffrey Mfg. Co., Columbus, Ohio, has announced several changes in branch office personnel: Howard S. Davies has been transferred from the Baltimore office to Chicago as district manager, conveyor division. H. C. Rockwell, formerly of the Columbus district office, has replaced Mr. Davies. Paul M. Hendry succeeds Mr. Rockwell at Columbus. William K. Myers, formerly of the New York office, succeeds B. L. Lewis, deceased, as district manager of the Boston office. H. A. Lee of the St. Louis office has been appointed district manager of that office, now located in the Railway Exchange Bldg. Mr. Lee replaces F. L. Kolb, who has been transferred to the Chicago office as district manager, mining division. The following sales engineers have been transferred from the home office in Columbus to the various district offices as shown: Earl J. Woltz to Harlan, Ky.; J. R. Brisley to Philadelphia; Norman S. Bell Jr. to New York; and William T. Davis to Houston, Texas. J. W. St. John has been transferred from the Pittsburgh office to the Cleveland office.

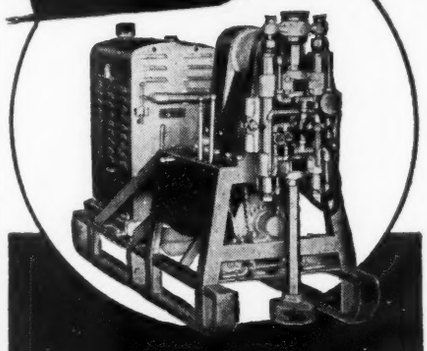
SCREENS FOR EVERY COAL PREPARATION JOB

•STAINLESS STEEL
•ALL WELDED CONSTRUCTION
•NON-BLINDING

BEE ZEE
BUILT TO YOUR SPECIFICATIONS

BIXBY • ZIMMER
ENGINEERING CO.
961 Abingdon St. • GALESBURG, ILL.

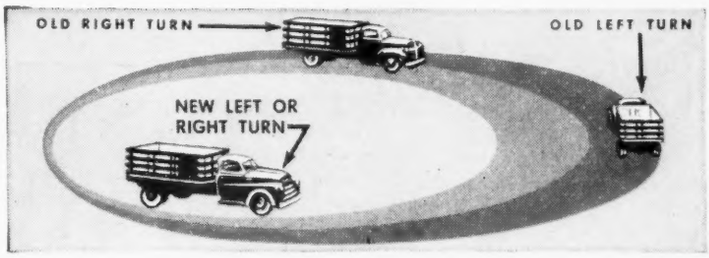
Diamond Core Drilling
CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

ONLY DODGE OFFERS YOU ALL THESE NEW Truck Features

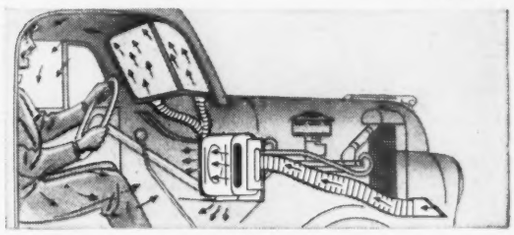


1. NEW ALL-WEATHER VENTILATION

Year-'round *comfort* is assured by a combination of fresh air intake, hot water *truck* heater, defroster tubes, vent windows, and cowl ventilator.

2. EASIER HANDLING BECAUSE OF NEW CHASSIS DESIGN

You can turn these new "*Job-Rated*" trucks in much smaller circles—and steering is much *easier*, too. This is due to a new type of steering, in combination with shorter wheelbases. Front axles have been moved back and engines forward, placing more of the engine and cab weight on the front axle. You get much better weight distribution.



3. MORE COMFORT FROM "AIR-O-RIDE" SEATS

New weight distribution, wider tread front axle, longer springs produce a marvelous new "cushioned ride." "Air-O-Ride" seats give a "soft," "firm," or "medium" seat. 7 full inches of seat adjustment.

4. IN ALL . . . 248 BASIC "JOB-RATED" MODELS

Every unit of every Dodge truck, from engine to rear axle, is "*Job-Rated*" for economy, performance, and long life. You save money with a truck that fits *your* job! 248 *different* basic chassis and body models, engineered for gross vehicle weights up to 23,000 pounds, and gross train weights up to 40,000 pounds.

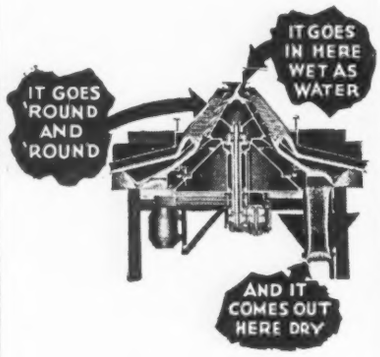
NEW DODGE "Job-Rated" TRUCKS

...and only Dodge builds "Job-Rated" trucks!

The "C·M·I" CONTINUOUS CENTRIFUGAL

The many installations of these "C-M-I" dryers in coal washing plants from Pennsylvania to Washington and Illinois to Alabama have proved that *all sizes* below ⅜ inch are delivered from "C-M-I"s with less surface moisture than can be obtained from any other type of mechanical dryer or dewaterer.

And at a cost of only a few cents per ton.



Let us tell you where these machines are in operation so that you may contact the operators and obtain from them full data on an operation similar to your own.

CENTRIFUGAL AND MECHANICAL INDUSTRIES INC.
3600 SOUTH SECOND STREET
ST. LOUIS 18, MO.

R. G. LeTourneau, Inc., Peoria, Ill., has created a wire-rope sales department as part of its sales division and will offer a full line of sizes, types and construction of preformed and non-preformed wire rope under trade name, "Tournarope." Direction of Tournarope sales will be under the supervision of W. H. Wilson, wire-rope sales manager. Prior to joining LeTourneau in August, 1947, Mr. Wilson was associated with John A. Roebling's Sons Co. Assisting Mr. Wilson will be Michael R. Kahle and Alvin J. Becker, sales engineers. Mr. Kahle for eight years was employed by the Broderick & Bascom Rope Co. as district sales representative in the coal and industrial fields. Mr. Becker joined LeTourneau in 1937. He was production manager when transferred to the sales division in July, 1947.

Allis-Chalmers Mfg. Co., Milwaukee, has announced that James M. White, vice president in charge of manufacturing, has resigned, effective Jan. 17. Mr. White, who joined A-C in 1929, will remain in an advisory capacity to Pres. Walter Geist for the next six months. Manufacturing operations will continue under the direction of Fred S. Mackey, general works manager in charge of all general machinery plants, and Hugo W. Liebert, general works manager in charge of all tractor plants.

Mines Engineering Co., 307 North Michigan Ave., Chicago 1, has recently been organized to specialize in the design and construction of mining plants. Louis K. von Perbandt, for many years associated with Allen & Garcia Co., is president of the new company.

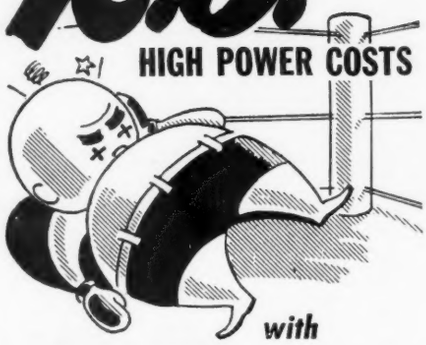
The Ohio Brass Co., Mansfield, Ohio, has transferred T. J. Harris, formerly district manager in Kentucky and Tennessee, to the Chicago office where he will take over the territory formerly handled by the late Carl Burkhalter. Paul E. Wright has been appointed district manager of the Kentucky-Tennessee territory, replacing Mr. Harris.

Westinghouse Electric Corp., Pittsburgh, has appointed F. D. Weatherholt assistant industrial sales manager, with headquarters at East Pittsburgh. Mr. Weatherholt, who joined Westinghouse in 1921, was formerly eastern resale manager.

John A. Roebling's Sons Co., Trenton, N. J., has named E. George Hartmann general sales manager. Mr. Hartmann, who brings to his new position over 29 years of experience in the wire field, has been associated with Roebling since 1940.

Atlas Powder Co., Wilmington, Del., has appointed A. F. Hutcheson manager of its anthracite district office at Tamaqua, Pa. R. E. Hobart Jr. has been made assistant manager. H. K. Seligman, manager of the office since 1932, will continue as Atlas represen-

K.O. HIGH POWER COSTS



with MESCOWELD rail bonds

Proper bonding keeps power costs low... and MESCO rail bonds guarantee perfect bonding. Mesco bonds prevent power "leaks" and assure full conductivity at all times. 18 types are available for immediate delivery. Write for details.

Type M8-F

Mosebach Electric & Supply Co.
1115 Arlington Avenue Pittsburgh 3, Pa.
HEmlock 8332

CARBON BRUSHES AT YOUR Fingertips WITH REFERENCE BOOK No. 19-E

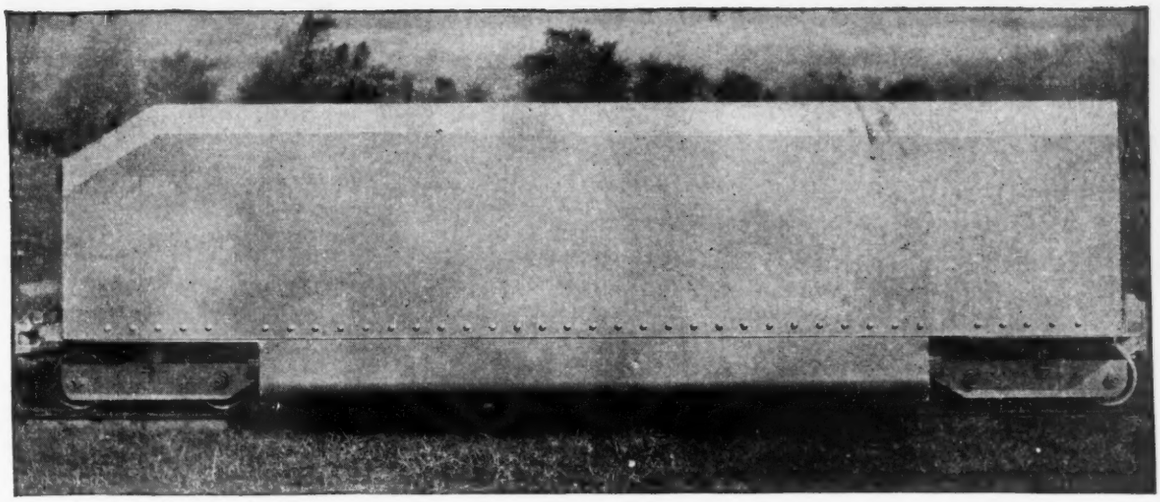
GIVE YOUR MOTORS A CHANCE
EQUIP THEM WITH
OHIO
MOTOR BRUSHES

ORDER AN ADVANCE STOCK AND INSTALL AT A MOMENT'S NOTICE

In Catalog 19-E, brushes are listed alphabetically by motor and equipment manufacturers name. At least 15,000 styles of motors are listed. It's a plain "dollars and sense" policy to order an adequate stock of emergency brushes, a few sets of each, and preserve economy in your motor maintenance.

SEND FOR THIS CATALOG NOW!

THE OHIO CARBON COMPANY
12508 BEREA ROAD
CLEVELAND 11, OHIO



DIFFERENTIAL MINE CARS

DIFFERENTIAL large capacity mine cars increase the capacity of loading units because there are fewer car changes. The 8-wheel AXLESS Truck construction allows for maximum capacity within given clearance limits. This construction features long gentle spring action resulting in the utmost roadablity and practically eliminates road cleaning cost as the topping on the car is not shaken off even at high speeds. Construction is simple and rugged. Maintenance is at a minimum. Write for Bulletin D-53.

DIFFERENTIAL MAN-TRIP CARS

DIFFERENTIAL MAN-TRIP CARS provide safe, speedy, and comfortable transit for 38 passengers per car. Roof construction is extraordinarily strong to prevent injury to men due to rock falls. Top is also insulated against accidental contact with trolley wire. Closed in construction protects men from water, flying particles and cold intake air. DIFFERENTIAL AXLESS truck construction with its long gentle spring action and spring draft gears contribute to the comfort of the passengers. Write for Bulletin D-54.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS

Give Your
Conveyor Belt
NEW LIFE
with
BRISTOL'S
BELT LACING

★ Quick to Install

★ Joins New Belts Firmly

★ Makes Long-Lasting Repairs

★ For Leather, Rubber, Woven Belts Up to 13/16" Thick

★ Requires Only Hammer and Block of Soft Wood

ORDER FROM YOUR DISTRIBUTOR

THE BRISTOL COMPANY
Mill Supply Division
135 Bristol Road, Waterbury 91, Conn.

Goodman Increases Factory Space

KEYNOTING ITS 1948 ACTIVITIES, Goodman Mfg. Co. has added over 100,000 sq.ft. of floor space to its manufacturing facilities, with the acquisition of this nearby building and an addition to its main plant. Production of mining machinery already is under way at the newly acquired plant and manufacturing facilities will be materially increased when installation of modern machine tools and other equipment in both additions is completed. An enlargement of office facilities at the main plant also is planned.

Chicago Pneumatic Plans New Utica Plant

NEW CHICAGO PNEUMATIC TOOL CO. PLANT to be constructed in Utica, N. Y., this spring will reportedly be one of the most modern industrial buildings in the East, providing over a half-million feet of floor space, all on one story. According to the company, expanding markets and increasing demand for its products have necessitated the plant, which has been designed in line with the newest techniques in materials handling, work simplification and safety provisions.

FLEXIPIPE
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.

When Other Machines are Down for Repairs

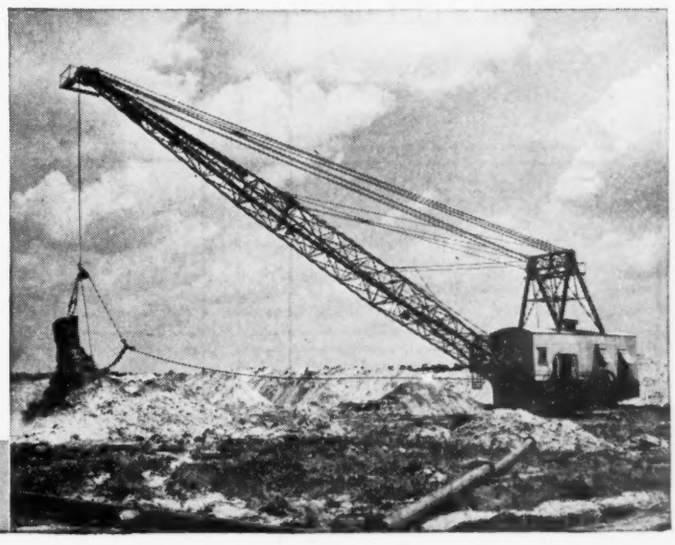
Bucyrus Walkers are Moving Dirt

The secret of the low maintenance requirements of a Bucyrus-Erie walking dragline lies in its complete simplicity. Look one over from stem to stern — you can't help noticing the absence of intricate gears and shafts, the lack of complicated gadgets that cause trouble and put a crimp in efficiency.

Main machinery parts are big in size, small in number, easy to get at. Walking machinery has nothing more complex than a shaft and a rolling cam, whose smooth rotating and sliding action cushions the machine down without jerk or shock.

Booms: 110 to 250 ft.
Buckets: 4 cu. yd. to 25 cu. yd.

Maintenance is low on a Bucyrus-Erie because there's so little that can go wrong. That means more time to make full use of the famous "years ahead" digging action that produces the production results you want!



BUCYRUS ERIE

23M47

SOUTH MILWAUKEE, WISCONSIN

tative and act in an advisory capacity in the anthracite district. Mr. Hutcheson joined Atlas in 1926 and has been assistant manager since March, 1946. Mr. Hobart was first employed by Atlas in 1933 and has been in sales work in the Tamaqua district since 1944.

Norma-Hoffmann Bearings Corp., Stamford, Conn., has elected Charles Pomeroy Collins president and a director. Mr. Collins was formerly secretary and general counsel, SKF Industries, Philadelphia.

Bemis Bro. Bag Co., St. Louis, has promoted Bradford R. Stetson, superintendent of its Minneapolis bag factory since 1937, to the company's general production department in St. Louis as office assistant. Mr. Stetson joined the Bemis organization in 1927 as a member of the engineering department and in 1930 transferred to Minneapolis.

Lima Shovel & Crane Division, Lima-Hamilton Corp., has appointed J. T. Conners, Cleveland, Ohio, as its agent for Northeastern Ohio. Mr. Conners has been associated with the industry for the past 30 years, forming the Conners Equipment Co. in 1946.

Hewitt-Robins Inc., Passaic, N. J., has leased a warehouse at 1010 Pennsylvania Ave., Charleston, W. Va., to step up deliveries in the area, particularly the mining areas of Virginia, West Virginia, Kentucky, North and South Carolina. The new warehouse will stock complete mine conveyors, screen parts, conveyor belting, idlers and other items in the Robins Conveyors Division line, ready for shipment and will serve as the company's Charleston office. The Galigher Co., Salt Lake City 4, has been appointed as exclusive representative for the Robins Conveyors Division in Utah, and parts of Idaho, Montana, Nevada and Wyoming. Hewitt Robins also has opened a new sales office at Kansas City, Mo., headed by C. Boyd Goodhart, of 5172 Tracy St.

Link-Belt Co., Chicago, has appointed H. Merrill Bowman, formerly district sales manager of its Baltimore office, assistant divisional sales manager for power-transmission equipment, with headquarters at Chicago. Eugene S. Bogart has been named to succeed Mr. Bowman. Mr. Bogart is being transferred from the Pittsburgh office, where he served customers in western Pennsylvania and northern West Virginia territories. Link-Belt's Pittsburgh, Pa., offices have been moved to 5020 Centre Ave., to provide larger space needed. Plans are under way to erect a new office and factory, branch building on the site.

Timken Roller Bearing Co., Canton, Ohio, has named Elmer Anderson, formerly assistant service manager, service manager for the company, to succeed Pardee H. Frank, who retired Feb. 1, after 27 years of continuous service. Mr. Anderson joined Timken in 1929 in the industrial engineering department and has been with the service engineering department since 1931.

Pennsylvania Refining Co., Cleveland, Ohio, has appointed D. A. "Red" Fassas, Lexington, Ky., to its sales force, to cover Kentucky and Southern Ohio.

Standard Oil Co. of New Jersey, New York, has changed its name to the Esso Standard Oil Co. The change was made to give formal recognition to the close association which has developed in the public's mind over a period of years between the corporate name of the company and its Esso trade-mark which was first used in 1925, the company said.

Air Reduction Sales Co., New York, has named Dr. G. V. Slottman, formerly manager, technical sales division, technical assistant to the vice president. Dr. Slottman has been associated with Air Reduction for the past 12 years. Scott D. Baumer, formerly assistant manager of the division, has been named to succeed Dr. Slottman, and Edward H. Roper has been appointed assistant manager.

Eutectic Welding Alloys Corp., New York, has named Theodore I. Leston, formerly director of production, vice president in charge of production.

Davey Compressor Co., Kent, Ohio, has appointed Davies Equipment Co., Frackville, Pa., dealer for its line in a number of Pennsylvania counties.

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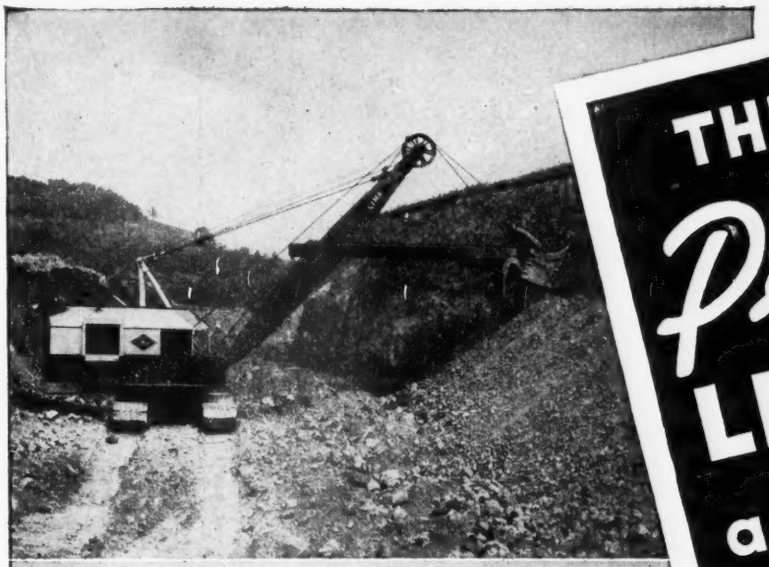

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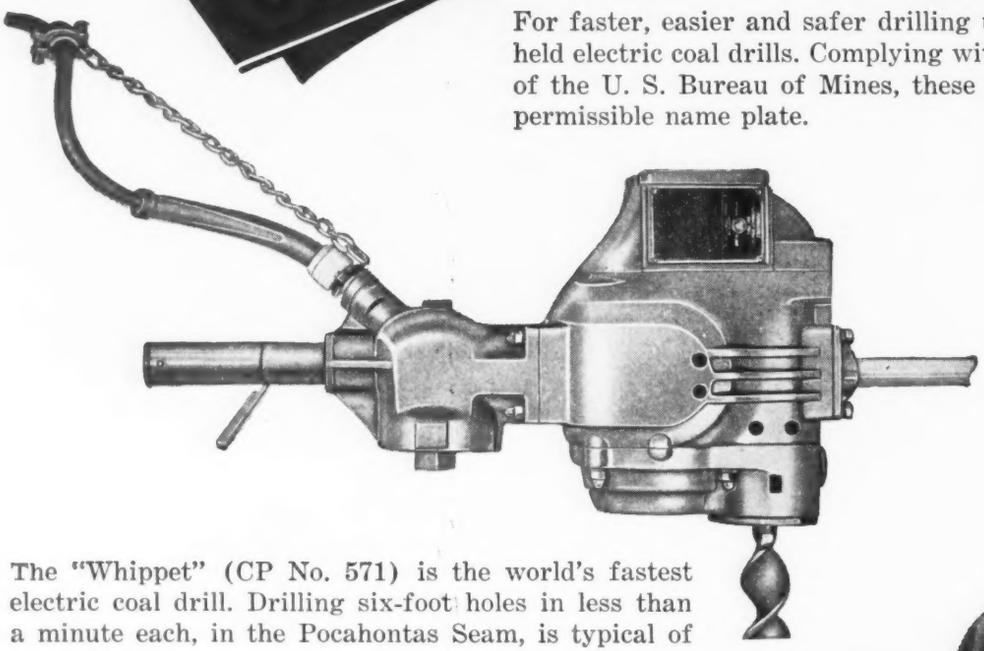

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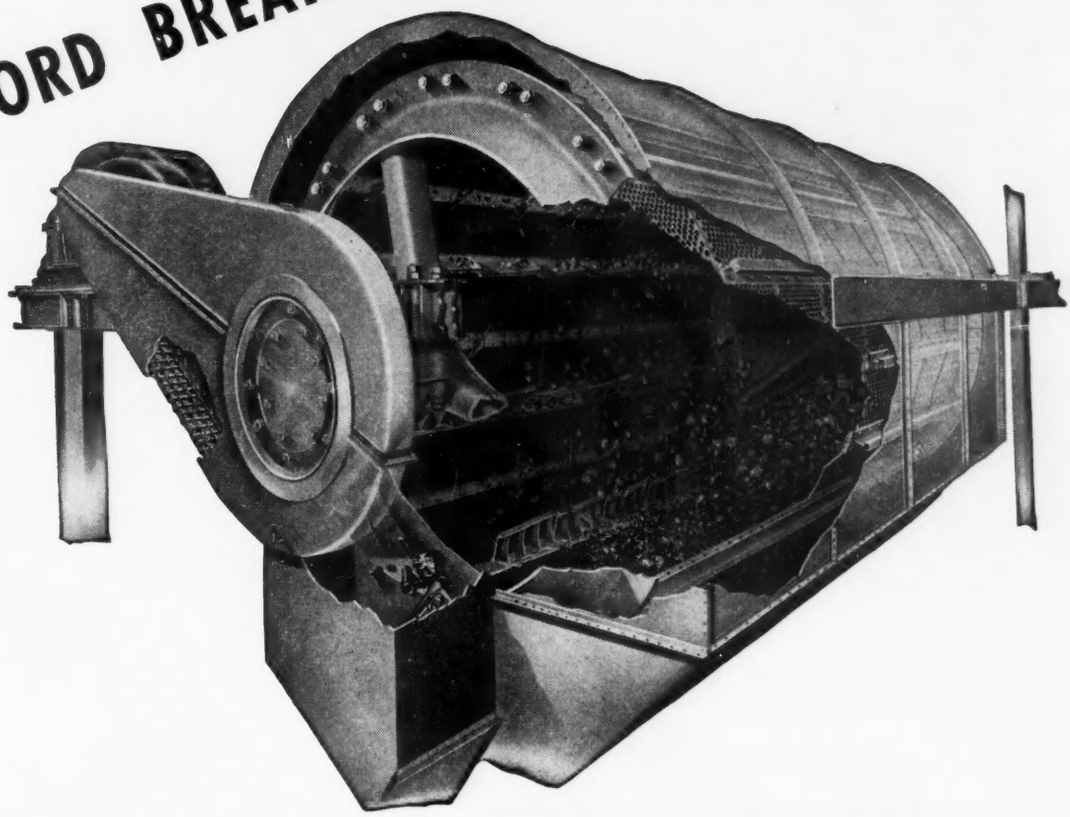

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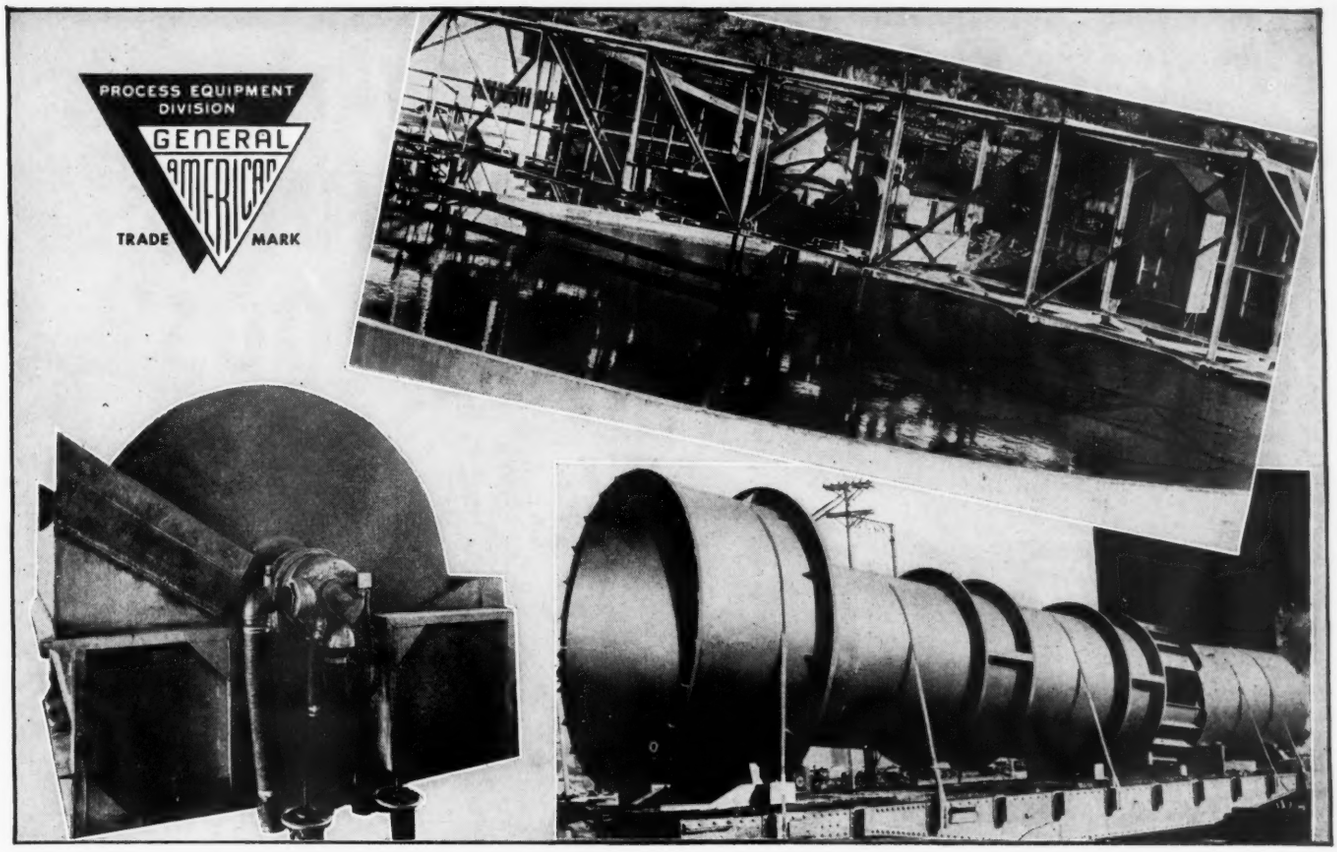

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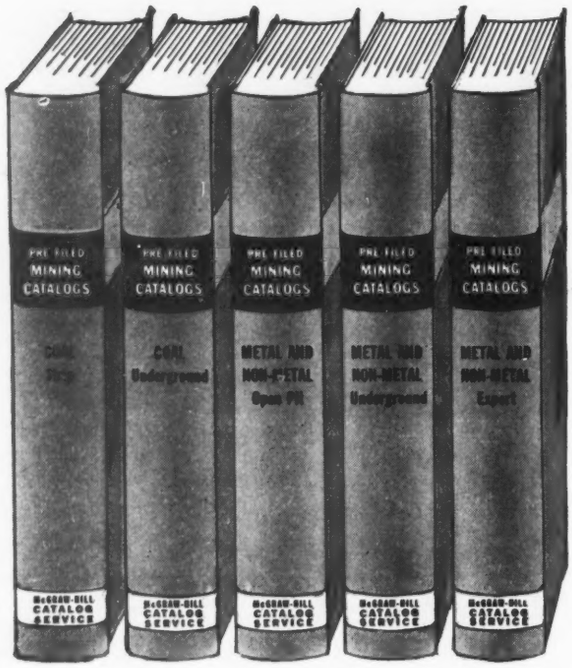

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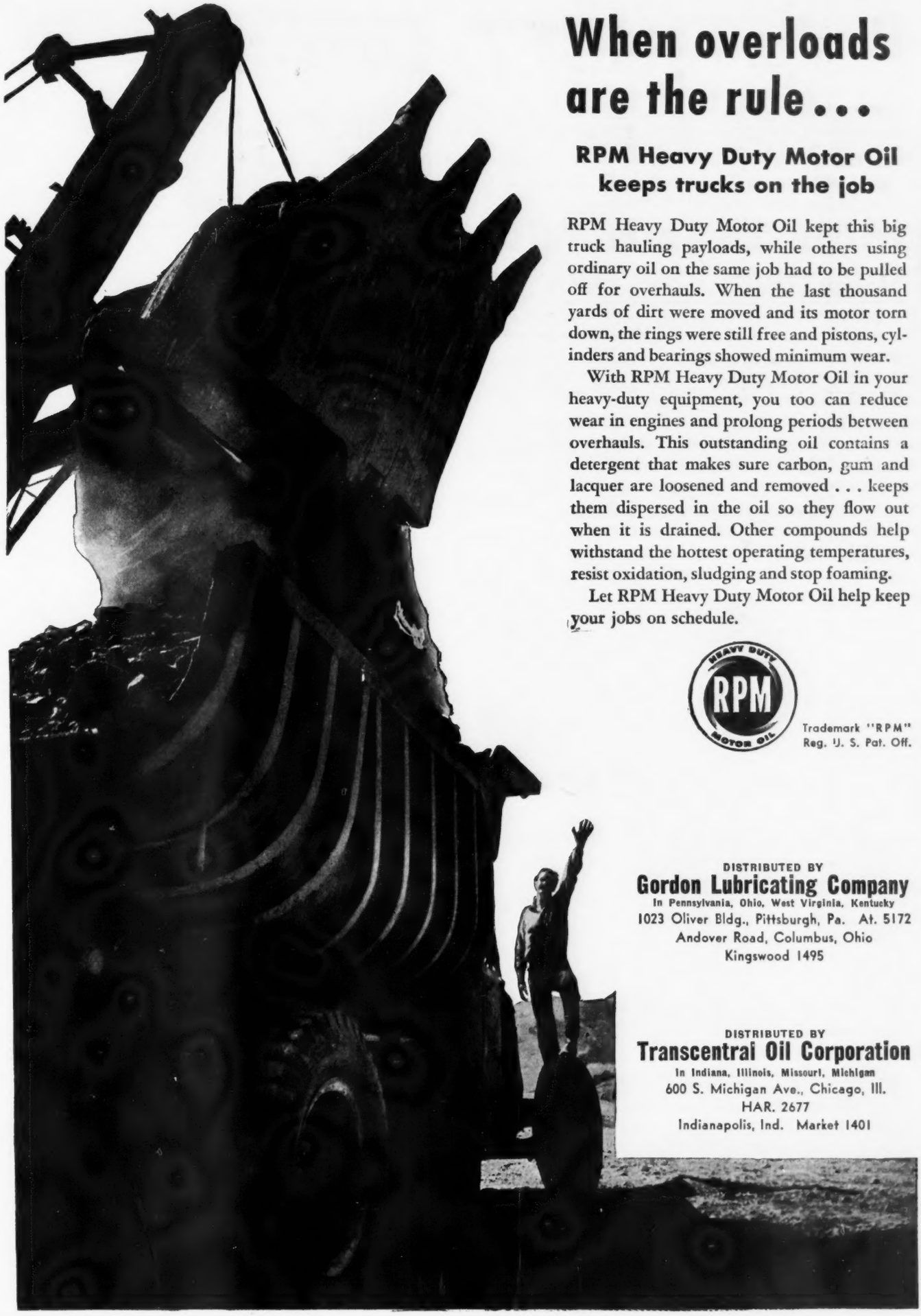

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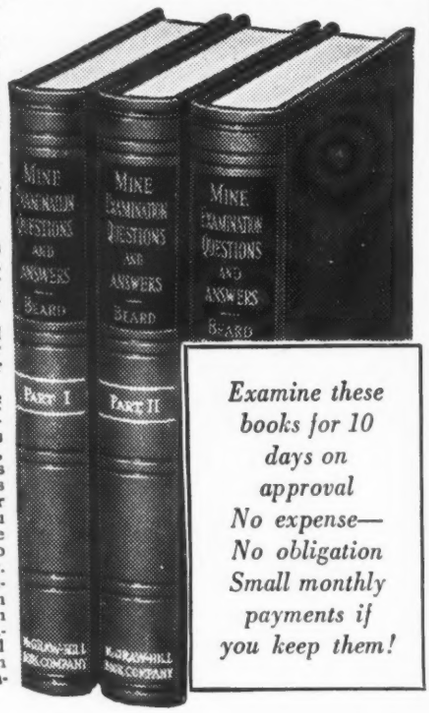

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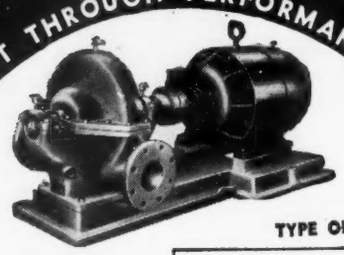

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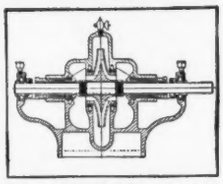

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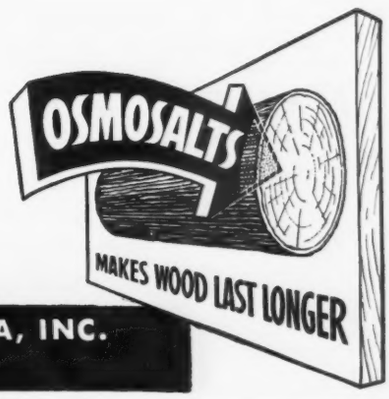

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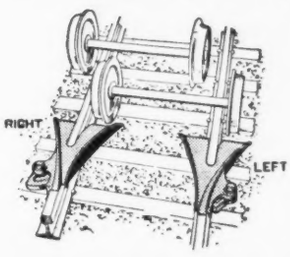

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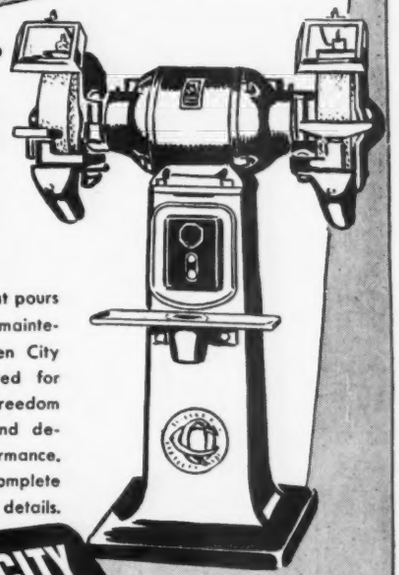

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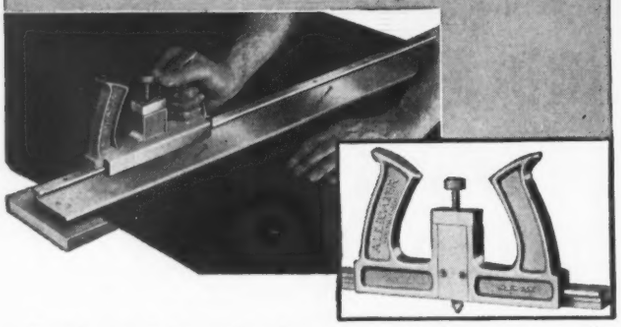

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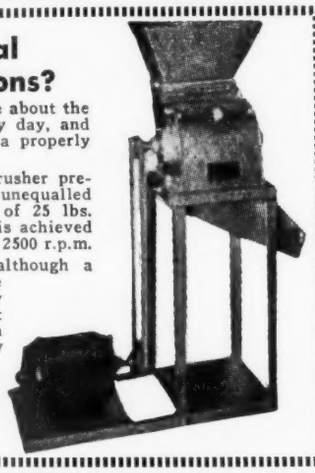

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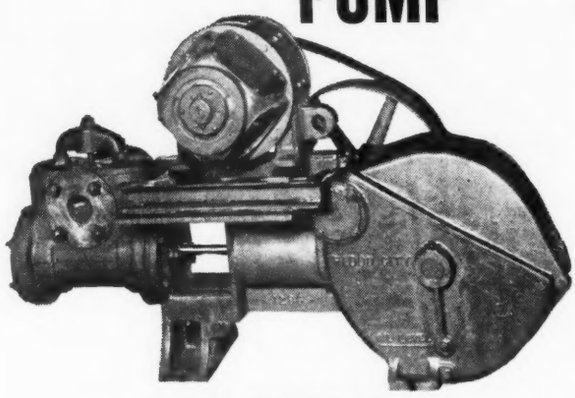

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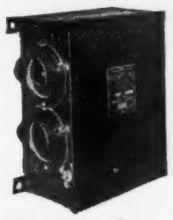


NUSSCO AUTOMATIC MINE SIGNALS

For Main Haulage • Prevent Collisions
Save Trip Time

A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

Low in cost • Easy to install • Write for Catalog

NACHOD & UNITED STATES SIGNAL CO.
INCORPORATED
4771 Louisville Ave., Louisville, Ky.

CESCO ELECTRICALLY OPERATED TRACK SWITCH

Thrown by Motorman
Operates Switch Safely • Saves Time and Money

This modern track switch is thrown swiftly and safely by motormen as they sit in their cabs. It saves time and money, and is fool-proof and dependable!

Over 40 years experience manufacturing
ELECTRIC TRACK SWITCHES
Write for Catalog

CHEATHAM ELECTRIC SWITCHING DEVICE CO.
INCORPORATED
4780 Crittenden Drive, Louisville, Ky.

PERFORATED METAL COAL MINING SCREENS

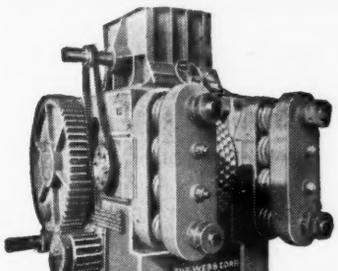
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

Since 1835 . . .

HEADQUARTERS for
Dependable, Cost-Cutting
PIT, MINE and QUARRY Equipment

McLANAHAN and STONE CORPORATION
HOLLIDAYSBURG, PENNA.



Model 30-22
Briquette Press

WEBB

HEAVY DUTY BRIQUETTE PRESS

For Coal and Other Materials

WRITE FOR DATA

THE WEBB CORP.

Manufacturers

WEBB CITY, MISSOURI

Complete Briquetting Plants Designed and Constructed.

What makes one man worth $40,000—another only $4,000? This book shows

How to cultivate your top-executive qualities

Here is a practical, inspiring book which brings you an amazing success formula. It outlines a specific, detailed plan for cultivating the qualities which mark the top-flight business leader today—illuminating each point with intimate, on-the-job studies of currently outstanding executives. It provides a blueprint for directing the same efforts and thinking which you already expend daily toward the definite goal of improving your executive ability.

Some facts this book gives you

- the secret of executive personality
- 24 guideposts to productive thinking
- 11 aids for making decisions
- how to budget time most effectively
- 12 tested techniques for giving instructions
- how to talk to groups effectively
- how to handle responsibility
- how to give yourself publicity

DEVELOPING YOUR EXECUTIVE ABILITY

by Howard Smith, Personnel Consultant, Noted Lecturer, and Instructor with Dale Carnegie Institute. 225 pages, $3.00

This valuable guide provides a blueprint that shows you how to win executive success. It is packed with helpful pointers that tell how the up-and-coming executive can make the most of his capabilities.

See this book
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Send me Smith's DEVELOPING YOUR EXECUTIVE ABILITY for 10 days' examination on approval. In 10 days I will remit $3.00 or return book postpaid. (Postage paid on cash orders).

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PLAN to Come to THE GREATEST SHOW ON EARTH for the CONSTRUCTION INDUSTRY

BETTER ROADS FOR A BETTER WORLD

45th Annual Convention and Road Show

SOLDIER FIELD
CHICAGO
JULY 16-24, 1948

AMERICAN ROAD BUILDERS ASSOCIATION

OVER 30 FOOTBALL FIELDS OF EQUIPMENT

- The Most Important highway and construction event in 1948!
- For the First Time heavy machinery exhibited and OPERATED out-of-doors!
- Brand New ideas in equipment!
- Completely new types of equipment for greater job profits!
- Discussions on pertinent Highway and Construction problems by international authorities!

If you are going to keep up with changing conditions, changing methods, changing costs and new and projected equipment, you can't afford to miss the International Road Show and Convention. Remember this is the *first Road Show since the war*—your first opportunity to see new and improved equipment first-hand. Plan to set aside July 16 to 24 for bringing yourself up-to-date on what is going on in the construction industry.

Here is a nine-day opportunity to compare all types of construction equipment, meet old friends, make new contacts and hear international authorities discuss the latest methods on the construction and maintenance of streets, roads and airports. Don't wait—Make your reservations NOW.

45th ANNUAL CONVENTION AND INTERNATIONAL ROAD SHOW

SOLDIER FIELD • JULY 16-24, 1948

This Advertisement Appears with the Compliments of

COAL AGE

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RELEASED

UNDISPLAYED RATE:
Not available for equipment advertising
90c a line. Minimum 4 lines. To figure advance payment count 5 average words as a line.
(See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time individual salaried employment only), ½ the above rates.
PROPOSALS, 75 cents a line an insertion.

INFORMATION:
BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE
The advertising rate is $7.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

NEW ADVERTISEMENTS received by 10 A.M. February 9th will appear in the March issue subject to limitations of space available

---

WANTED

Geologist-Engineer
(Graduate or Practical)

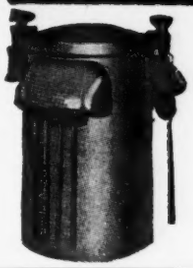
LANDMAN

To help find and develop COAL Properties

If you have reason to believe that you can help us locate some good coal properties ANYWHERE (preferably for strip mining) we can offer you a most attractive proposition. Either part or full time. Write—

MORGAN MINES, INC.
19 W. 38th St., Indianapolis 8, Ind.

—TRANSFORMERS—



TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
Station M **Since 1912** **CINCINNATI 27, OHIO**

Truck Coal acreage on paved highway. Two seams above water 2½ percent ash semi-smokeless. None better for stoker. Twelve thousand tons removed many years ago via river barge. One seam open with improvements.

E. W. HOLT
Box 207 **Central City, Ky.**

ATTENTION—COAL STRIPPERS
FOR RENT
LORAIN Model 80 Diesel 1¾ cy. Shovel and 100' Dragline, completely rebuilt. A1 condition.
BENDIX MACHINERY CO., INC.
401 Broadway, New York 13, N. Y.
Tel.: Canal 6-5693

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

FOR SALE
COAL MINE
Fully equipped coal mine in Western Penna., producing 100 tons daily in one of the best truck coal market areas. Large acreage on hard road, short hauls.
BO 3876 Coal Age,
330 West 42nd Street, New York 18, N. Y.

WANTED

FOR SALE
Coal mine and acreage in fee, 10 miles from R.R., on paved highway, first completed tipple and necessary buildings on place. Cars, rails, tools, mules on property. Much arceage available. Further information on request.
E. W. Holt, care First National Bank, Central City, Ky.

FOR LEASE:
OHIO STRIP COAL LAND
MAHONING COUNTY, OHIO
Thirteen to forty foot overburden. No hard rock, 3½ to 4 foot good coal. On hard surface roads. Close to Railroad and within 14 miles of Youngstown, Niles and Warren. Party drilled. 337 acres. Level land. Give financial and other qualifications with inquiry.
Owner: Donald Kirk, Axis, Alabama

WANTED
¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910

ONE MYERS WHALEY LOADING MACHINE
Special for heavy rock loading.
Guyan Machinery Company
Logan **West Virginia**

INVEST IN COAL LANDS
For Sale, 20,000 acres of virgin Pittsburgh #8 coal, near Penna. and B. & O. RR., suitable for underground mining. Also several thousand acres of stripping coal. Eastern Ohio.
For further information write to
Frank Signorelli, Realtor
Weirton, W. Va.

WANTED
LOCOMOTIVES
Two storage battery, five or six ton, forty-two inch gauge, thirty to thirty-six inches high, locomotives complete with batteries and charging unit. Write **Raders Creek Coal Co., Manchester, Ky.**

COAL LANDS
Suitable for strip mining. Complete details upon request.
G. B. LORRAINE
Law Building, Richmond 19, Va.

WANTED
Arzinger Coal Washer in operating condition. Give voltage, location and price.
MACKENZIE COAL CO.
Hanna Bldg. **Cleveland 15, Ohio**

STRUCTURAL STEEL of all kinds
Used HC 6", 20#, 13 ft. 9" long, to hold up roofs. Black flexible roof paint in 5-gal. cans—$1.00 per gal.
SOUTH BROOKLYN IRON & PIPE CORP.
312 3rd Ave. — Triangle 5-4317 — Brooklyn, N. Y.

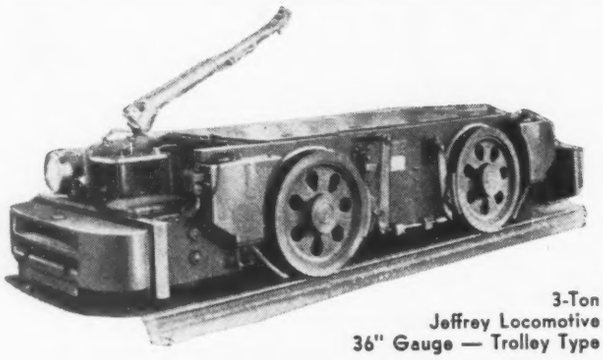
BUILDINGS
20 ft. to 160 ft. clear span.
40 ft. to 600 ft. length.
Also Light Utility Buildings.
A. JAY HOFMANN COMPANY
Narberth, Pa.

WANTED TO BUY
One—Type #11-BU Joy Loader for operation on 250-volt direct current, 44" track gauge, completely equipped.
W3996 Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

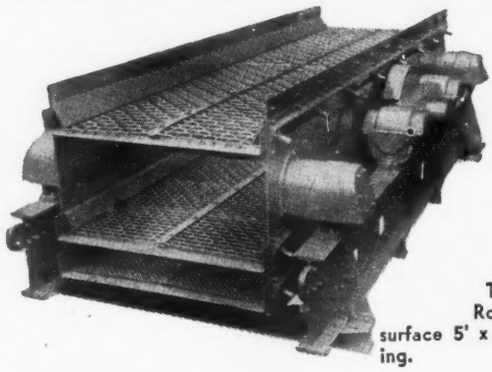
COMPLETE LIQUIDATION

IMMEDIATE DELIVERY

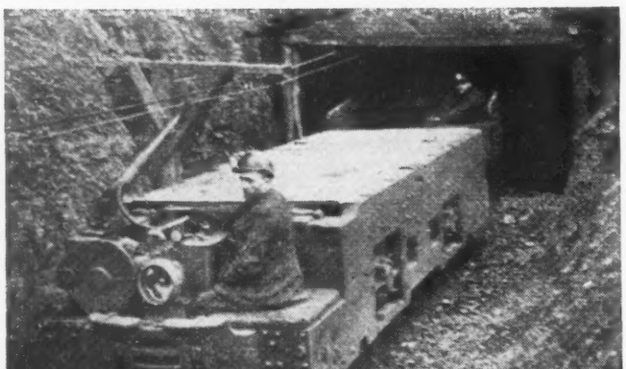
... Three and one-half million dollars in new and nearly new coal mining machinery and equipment



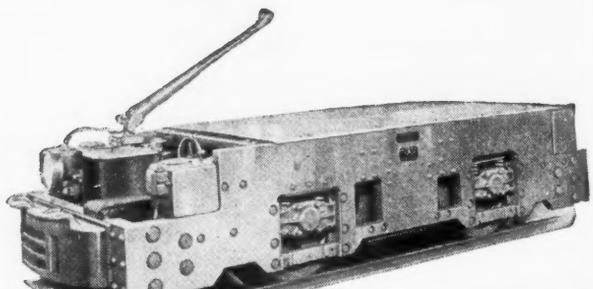
3-Ton
Jeffrey Locomotive
36" Gauge — Trolley Type



Type F-600 Ty-Rock Screen 2—surface 5' x 10' Full Floating.

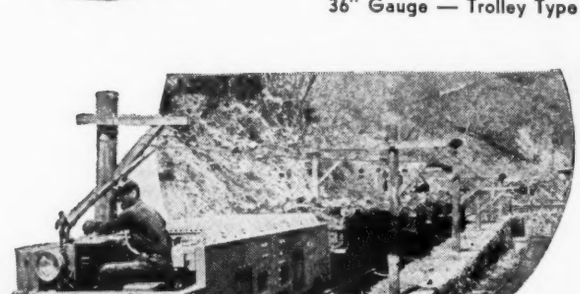


6-Ton Jeffrey Locomotive 36" Gauge — Trolley Type



10-Ton Jeffrey Locomotive
36" Gauge — Trolley Type

20-Ton Goodman Locomotive High Type — 36" Gauge



8-Ton General Electric
Locomotive — 36" Gauge

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEE PAGE 197 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

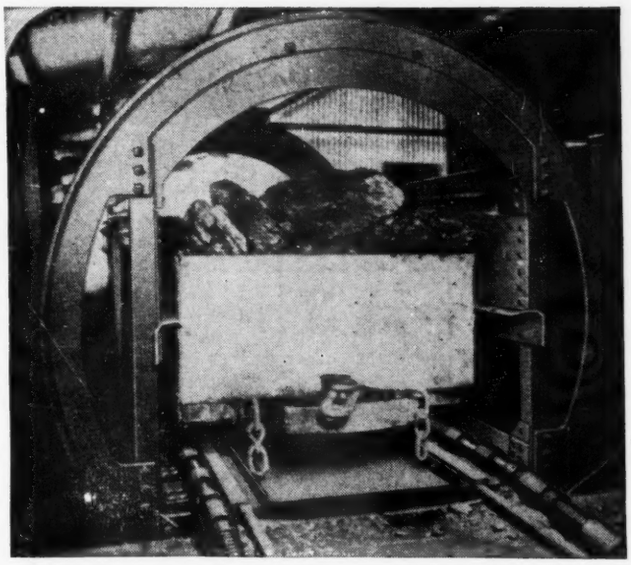
THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

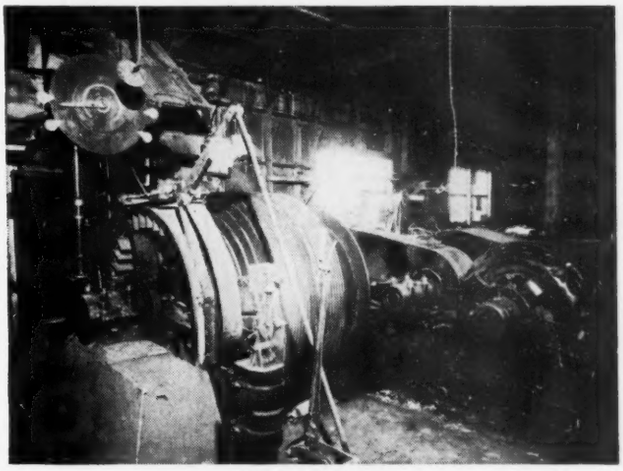


ROTARY CAR DUMPER
Fast Dumping of Coal Cars

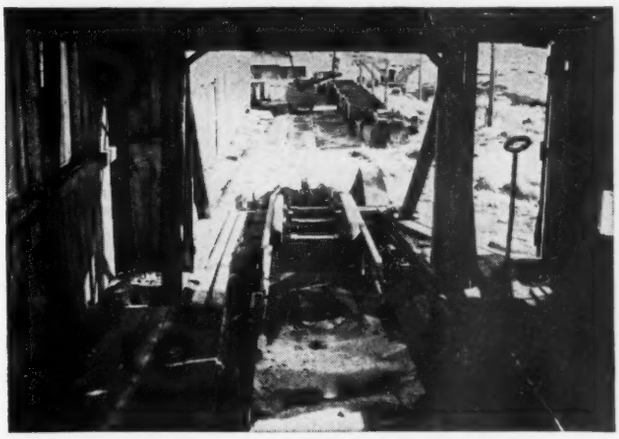
HERE ARE SOME OF THE HARD-TO-GET OFFERINGS

150—2 Ton 36" Ga. Mine Dump Cars, roller bearing.
HAULAGE MOTORS, trolley type locomotive—250 Volt D. C.—electrically driven, 36" gauge, General Electric, Westinghouse, Jeffrey and Goodman.
COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" Gauge TRUCKS, Type "M."
MINING MACHINE TRUCKS—Joy "T-1."
MOTOR GENERATOR SETS—1 set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. 1 set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.
BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.
MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.
TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.
BOX CAR LOADERS—Ottumwa—Manerre.
PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.
FANS—American Blower, Sturdevant.
TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.
VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.
SHAKER SCREENS—"Marcus" shaker screens.
CONVEYORS—Flight conveyors, elevator conveyors.
COAL CRUSHERS.
RAILS—150 tons 60 lb., 350 tons 65 lb.
SPIKES, bolts, tie plates, frogs, switches, switch throws.
COPPER trolley wire—2/0, figure 8 and 4.0 round.
TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.
TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM.
JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.
SHUTTLE CARS—Joy 42D storage battery.
ELEVATOR CONVEYORS—Joy.
AIR COMPRESSORS.
MACHINE SHOP—Complete.
ELECTRIC SHOP—Complete.
CARDOX PLANT—Complete.
BATTERIES—Exide and Gould Ironclad, 24 cells.
$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

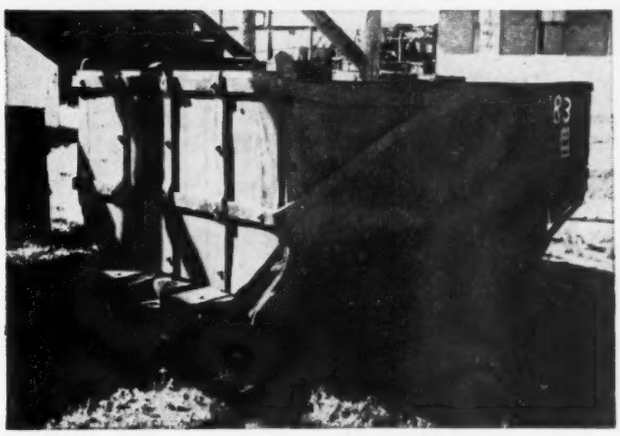
ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION.



Cornical Drum Hoist, 300 HP, Drum 8'-6" Dia. x 72" wide



Phillip's Crossover Dump and Car Retarder



Tipple Car, 2 Ton, 36" Gauge

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

AUCTION!

By Order of the

U. S. DISTRICT COURT

for the

SOUTHERN DISTRICT

of Illinois

SOUTHERN DIVISION

We Will on

Tues. April 27, 1948

Commencing at

11:00 A.M. (CST)

AT

CARLINVILLE, ILL.

Macoupin County

Sell at

Public Auction

The Entire Assets of

STANDARD COAL MINING & CONVERTERS CORPORATION

BANKRUPT NO. 11629

Property Appraised by

Allen & Garcia Co.

At Over

$2,500,000.00

HON. BASIL H. COUTRAKON
REFEREE IN BANKRUPTCY

ROBERT C. SOLOMON
TRUSTEE IN BANKRUPTCY

HARRY J. MYERSON
and
LESLIE G. PEFFERLE
ATTORNEYS FOR TRUSTEE

★

Descriptive Circulars may be Obtained from the Undersigned Auctioneers

★

MICHAEL TAUBER & CO.

AUCTIONEERS

411 S. MARKET STREET

CHICAGO, ILL.

TELEPHONE: WEBSTER 4500

CRAWLER AND LOCO. CRANES

1—30-ton Marion #362 Diesel Crawler 1½-yd. shovel front, D/L attachments, 60′ boom, D13000 caterpillar diesel engine, 33″ cats., first class condition.
1—¾-yd. same as above, Marion #332.
2—¾-yd. Buckeye Gas Shovels and Cranes.
1—Link Belt K45 Crane and D/L, 70′ boom. Wisc. Gas Motor.
1—1½-yd. Link Belt K40 Diesel Shovel Crane and D/L, 80′ boom.
1—30-ton IBH Steam Loco. CRANE, 55′ boom, code boiler, good cond.
1—40-ton BROWNING Steam Loco. CRANE, 50′ boom.
1—20-ton ditto, Link Belt.

MINE AND SLOPE HOISTS

1—10,000± cap. Vulcan Sgl. Drum Hoist, 4′x4″ drum, 250 HP, AC.
1—5,000± cap. Lidgerwood Sgl. Drum Electric Hoist, 600 FPM, GE motor, 250 HP, AC.
1—8,000± cap. Ottumwa Hoist, 250 HP, AC. Cross load 17,000±. 850 FPM.
1—30,000± cap. dbl. drum Vulcan Hoist, split drums. Capacity, 2,000′, 1⅛″ cable. Motor 350 HP, AC.
1—8,000± cap. Washington Iron Wks. Sgl. Drum Hoist with 200 HP, 440/3/60 AC, GE motor.
2—20,000± cap. Dbl. Drum (parallel) Electric Hoists with 150 HP DC motors, speed 200 FPM, drum cap. 1,000′.
1—10,000± cap. Lambert 3 drum (derrick) Electric Hoist with separate motor swinger with control.
5—Sullivan 3 drum scraper hoist with 60 HP motor, 220/440/3/60 AC. New condition.
1—9,000±, 3 drum (derrick) Clyde Steam Hoist with Code Boiler.

HOIST MOTORS

1—200 HP, GE 2300/3/60 AC, 585 RPM Motor with control.
1—225 HP, GE Motor for 440/3/60 AC, 585 RPM with control.
1—250 HP, Westinghouse Motor, 850 RPM for 440/3/60 AC.
1—200 KVA G. E. Turbine AC Generator.
1—150 KVA G.E. Turbine AC Generator.

CONVEYORS

1—1,275 ft. 42″ Belt Conveyor with drive.
1—1,000 ft. 60″ Belt Conveyor with Drive.
1—275 ft. 48″ Belt Conveyor with Drive.

CRUSHERS

1—24x36″ roll Crusher with 80 HP, AC Motor.

DIESEL MOTORS

3—6 cyl. 280 HP, Cummings Diesel Motor.

TRUCKS

3—25-yd. MACKS, side dump Gas Trucks.

AERIAL TRAMWAY

1—Aerial Cable Tramway, 1,250 ft. long x 1½″ rope with haul rope. Motor 60 HP, AC.

COMPRESSORS

1—600 ft. IR, 2 stage motor driven compressor, Imperial Type for 220/440/3/60 AC.
1—900 ft. Sullivan WJ Angle Compound Compressor with 150 HP, GE Motor, 220/440/3/60 AC.

DERRICKS

1—25 ton, 3 drum Stiff Leg Derrick with 90′ boom, AC.

HAWKINS & CO.
154 So. Michigan Ave.
Chicago (3) Ill.

---

for

DIRECT CONTACT with the MOST ACTIVE BUYERS throughout the COAL MINING INDUSTRY

Use the

SEARCHLIGHT SECTION

of COAL AGE

HYDRAULIC WHEEL PRESS

250 Ton—Caldwell #5 Hydraulic Wheel Press—38″ between Tie Bars—

IMMEDIATE SHIPMENT

Arthur S. Partridge

Railway Exch. Bldg. **St. Louis (1) Mo.**

DO YOU NEED COPPER WIRE?

We have in stock:

300,000 — 500,000 — 1,000,000 CM Stranded Cable—also 4/0 Grooved Trolley and 4/0 Solid Round.

Pneumatic Tired Trailers—4 Wheel, Roller Bearing, 21″ High—Can be used as Pit Cars, Supply Cars, etc.—Trackless Mines.

Handy Hoists—Compact All Steel—3-Ton Capacity.

Steel Beams and Angles—10 Inch, 35# to ft., 2½″ x 3″ and 6″ x 6″ Angles.

Two New 3-Drum Hoists, 100 H.P.

PRICES YOU CAN AFFORD TO PAY — QUALITY YOU CAN'T AFFORD TO MISS!

MANSBACH METAL COMPANY

Logan, W. Va. **Phone 1071**

BARGAINS IN USED EQUIPMENT

QUOTATIONS WILL BE MADE RECONDITIONED AND GUARANTEED, OR ON AN AS IS BASIS. ALL EQUIPMENT IN GOOD WORKING CONDITION—SOME PRACTICALLY NEW.

COAL CUTTERS

4—Sullivan CE-7 AC Short Wall, complete with Standard and Tip-turn Trucks, most machines with Power Cable.

TROLLEY LOCOMOTIVES

2—7½ Ton Goodmans, 36" Gauge, 250 Volt D.C.

MACHINE SHOP EQUIPMENT

2—Drill Presses 16" to 26".
1—200 Amp. Smith Welder—on wheels.
1—18" Gould & Eberhardt Shaper.
1—Cleveland Combination Punch & Shear, 26" Throat.
1—Power Hack Saw, B.D.
Bolt & Pipe Threaders, Chain Blocks, Swing Cranes with Crawls, Wood Planer, Saw Table, Hand Shears, etc.

COAL WASHING EQUIPMENT

2—Rheolaveur Launders, complete with Steel Supporting Frame.
1—60" Dia. Dividing Table, direct connected to 2 H.P. D.C. Motor.
1—Galigher Auto. Sampler with adjustable stroke & direct connected to a 1/6 H.P. Motor.
1—12' x 10' Steel Hopper Bin.
1—70' x 12' Dorr Thickener Tank, complete with mechanism.

COAL CRUSHERS

2—30"x30" Jeffrey Single Roll.
1—36" St. Louis Ring Type.
1—24x20 Jeffrey Swing-Hammer Mill.

JOY LOADERS

1—7-BU Joy Loader, Cat Mounted, Low Pedestal, 250 Volts DC, Overhauled and Guaranteed, Permissible Type.

PUMPS

1—2" Marsh, V-Belted to 15 H.P. Motor 150 GPM, 160' Head.
2—10x10 Allis-Chalmers Centrifugal, 1500 GPM, 56' Head, direct connected to a 100 H.P., 2300 Volt Center Drive Motor.
5—5x5 Deming Oil-Rite Piston Pumps—Motorized.

RAILROAD SCALES

3—100 Ton Fairbanks, Steel I Beam Stringers, Inpected by W. W. & I. B. in April, 1947.

COKE EXTRACTORS

2—Coke Extractors, 250 Volts DC, trolley operated, Std. R. R. Gauge.

STEEL BINS

1—16' x 24' Sectional Steel Bin.
2—10' x 20' Welded Steel Bins.

LARRY CARS

4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

CONVEYORS

3—24" Belt Conveyors, 15' to 85' Centers, 2 equipped with Ding's Pulleys.
1—30" Belt Conveyor, 370' Centers.
1—30" Belt Conveyor, 70' Centers.
1—36" Belt Conveyor, 50' Centers.
1—28" Apron Conveyor, 21' centers. Flight Conveyors from 12" to 30" up to 170' centers.

RAILS

16 Tons—30# Relayers. 50 Tons—65# Relayers.
25 Tons—40# Relayers.

MINE FANS

1—8-H60 Aerodyne Exhausting Fan, with Air Locks, Hood, etc. with 75 H.P. Motor—Purchased new in 1942.

HOISTS

1—No. 22 Vulcan, with Man Cage, 30' Steel Headframe and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake. (Hoist purchased new in 1942).
1—Single Drum Gasoline Hoist, direct connected to 2⅝x4¼ Wisc. Gas. Engine.
1—15 H.P. Single Drum Hoist, direct geared to motor with Controller and Grids.

PIT CARS

160—Card Iron Works R. B. Pit Cars, 36" Ga.
1—Card Iron Works Rock Car, 90 Cu. Ft. Cap.

MISCELLANEOUS

AC & DC Motors, new & used, from 2 H.P. to 75 H.P.
R.C. Stranded Copper Wire, 2/0—4/0 & 350,000 CMS.
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New CE-7 Sullivan Coal Cutter Parts.
New and Used Wire Rope, ⅜" to 1¼".
750' New 3-Cond. No. 6 All Rubber Power Cable.
1—3,000' Tramway, complete with buckets, etc.
1—750' Jig-back Tram, complete with motor.
Office Equipment, Electric Calculators, Typewriters, Desks, Filing Cabinets, etc.
1—Stiff-Leg Derrick, with crabs and cable.
3—Steel Lockers, 6 and 9 Compartments.
6—200 Gal. Galvanized Oil Tanks.
12" and 18" I Beams.
Bucket Elevators.
1—50 H.P. Cutler-Hammer DC Controller, with 2 Banks, Grids, Panel, etc.
Switchboard Equipment for DC Motors.
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1—No. 5 Buffalo Forge Blower, direct connected to 3 H.P. A.C. Motor.

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LOCOMOTIVES—250 VOLT DC

2—13-ton Westinghouse, type 908C
3—8-ton Westinghouse, type 906-B
6—8-ton General Electric, type HM-839
5—8-ton Goodman, type 32-I-4-T-2
6—6-ton General Electric, type HM-801

600—END DUMP 3½-TON STEEL MINE CARS

Height overall—46"
Length of body—9'
Overall length—10'2"
18" Timken roller bearing wheels
Wheel base—36"
Width—60"
Axles—3"
Steel bodies—3/16"
Draw bar—1"x4"
Oak bottoms—3¾"
3—Link couplings
3—Binders
Spring draw head one end
Track gauge—42"

400—ROTARY DUMP 4-TON MINE CARS

Height overall—42"
Outside length—11'4" which includes 6" round bumpers on each end
14" Timken roller bearing wheels
Loading end—32"
Outside width—5'
Axles—3½" alloy stel
3—Link hitchings and alloy steel pins
Track gauge—42"

SLOPE HOISTS

1—Vulcan Single Drum Hoist, Drum 6' in Diameter x 6' Wide, Capacity 6000' of 1½" Rope, Rope Speed 600 FPM, 30,000# Rope Pull Vertical at 350 RPM. Drum is demountable in four (4) pieces, equipped with Westinghouse 800 HP Motor, 435 RPM, 3 Phase, 60 Cycle, 2300 V, complete with Electric Controls, Resistance, and all necessary appurtenances.

1—Vulcan Single Drum Hoist, Drum 5' in Diameter x 4' Wide, Capacity 3500' of 1" Cable, Rope Speed 700 FPM, 10,000# Rope Pull, equipped with 250HP General Electric, 3 Phase, 60 Cycle, 440 V Motor with Controls, Resistance, and all necessary appurtenances.

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1—35 B Jeffrey Shortwall, 250 V. D.C.
1—35 BB Jeffrey Shortwall, A.C.
1—29 C Jeffrey Arcwall, 250 V, D.C.
1—124 E. J. Goodman Slabbing, 250 V, D.C.
1—36 B Jeffrey, 250 V, D.C.

LOCOMOTIVES

1—4-ton Jeffrey with MH 96 Motors.
1—5-ton Goodman with 2 type 41, 250 V. motors.
2—6-ton GE Gathering Locomotives with HM 823 motors.
1—10-ton Westinghouse, 907 motors, 250 V.

M. G. SETS

1—60 KW, 250 V, D.C. with 100 HP, Synchronous motor.
1—75 KW, 250 V, D.C. with 112 HP, Synchronous motor.
1—150 KW, Ridgeway, 275 V, D.C., 3/60/2200/1200.
1—200 KW, Allis Chalmers rotary converter.

ELECTRIC MOTORS

1—500 HP, GE Slipring 3/60/2200/600 RPM.
1—250 HP, GE, type I, Form M.
1—185 HP, Burke SC, 3/60/2200/1150.
1—150 HP, GE, Squirrel Cage, 3/60/900.
1—125 HP, GE, Squirrel Cage, 3/60/900.
1—100 HP, Synchronous Motor, 3/60/440/1200 RPM.
1—100 HP, GE, Squirrel Cage, 3/60/900 RPM.
1—40 HP, GE, 1200 RPM, 3/60/220-440 V.
1—25 HP, GE, Squirrel Cage, 3/60/865 RPM.
1—20 HP, GE, Squirrel Cage, 3/60/1200.
2—15 HP, Westinghouse, Squirrel Cage, 3/60/900.
2—10 HP, Westinghouse, CS, 3/60/440 V.

TRANSFORMERS

1—25 KVA, GE 1/60/2200/220/110 V.
2—75 KVA, Westinghouse, 1/60/6600/2200.

ELECTRIC HOISTS

1—3-ton Shepherd mono-rail, 250 V, D.C.
1—3-ton Euclid, same.
1—2-ton Chisolm-Moore, same.
2—1-ton Shepherd 250 V, D.C.

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LOCOMOTIVES & CRANES

80 ton Lima 6 wheel Switchers. New 1944.
65 ton Whitcomb Diesel-Electric. New 1944.
50 ton Gen. Elec. Diesel-Electric.
70 ton Porter Fireless steam locomotive.
30 ton Plymouth Gas Locomotive. New 1944.
2 yd. Lima Diesel Crawler Crane. 100' bm.

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3—20T Jeffrey and GE 500 V. 42" ga. (Can be rewound 250V.)
2—8T Goodman Perm. 500 V. 42"/44" ga. gath. (Can be rewound 250V.)

Rotary Con. & MG Sets (3 ph. 60 cy.)

640 KD Al. Ch. 250 v.—800 HP Syn. 2300 v. (available 2 months).
150 KW West., 125 v.—225 HP., 2,200 v.
1—150 KW Ridg. 250 v.—225 HP. Syn. 2300 v.
100 KW Burke 125 v.—2300/440/220 Syn.
50 KW G.E. 125 v. 75 HP G.E. 2200 v. 440/220 v.
3 New 10 KW 125 v. 220/440/3/60.
7½ KW Wooton 125 v. 10 HP. Wooton Vert.

GOODMAN SHAKER CONVEYORS

3—Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman #3 Duck Bills.

MINING MACHINES

1—35B Jeff. Perm. 250 v. 7½ Jeffrey Chain & Bar on revolving trucks.
1—35B Jeff. Perm. 250 v. 6" Jeffrey Chain & Bar on revolving trucks.
1—35B Jeff. Perm. 250 v. 6" Jeffrey Chain & Bar on revolving trucks.
412G3 Goodman AC Mches., 6½' bar.

STORAGE BATTERY LOCOMOTIVES

1—6/7 Ton Jeffrey 44" Ga.
1—6 Ton G.E. permissible 36/44 Ga. HM 825 BB.
4 Ton 36" Ga. Atlas 2 BB Motors.
1—5½ Ton Ironton Type A 36/42" Ga.

Haulage & Gathering Locomotives

18 Ton Westgh. 250 v. 36" or 40" Ga.
2—6-ton G.E. 250 v. HM 803 BB Motors, 36" Ga. O.S. Rolled Steel frame with flat top motor driven reel.
10 Ton Goodman 36BO4T O.S. fr. 250 v. 36" Ga.

COAL CRUSHERS

18x24 and 18x30 New Scottdale dbl. roll.

DC MAGNETIC STARTERS

New 230 v. DC Magnetic Cutler Hammer.
Starters, 25, 40, 50, 60, 75 & 100 HP.—150 HP.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 2 P.F.
750	West.	1200	Syn.	New B P.F.
435	G. E.	450	Syn.	ATI
300	G. E.	365	S.R.	MT 415-25cy.
300	West.	1800	S.R.	CW
250	West.	277	S.R.	CW 1814
100	G. E.	500	S.R.	M 1-25-cy.
75	West.	690	S.C.	C'S
50	West.	560	S.R.	CW 658 D
50	G. E.	900	S.R.	1-M
50	G. E.	720	S.C.	1 K
30	West.	1750	S.C.	CS 405

HOISTS, CRANES & PUMPS

400 HP Vulcan conical drum shaft Hoist.
100 HP Vulcan fixed drum 100 HP G.E. S.R. Motor.
1—50/75 HP 2 drum Meade Morrison slope.
75 HP Ottumwa slope with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. ft. drum geared to A.C.
25 HP sgl. friction Hoist—230 v. DC Motor.
15 HP Ottumwa sgl. fr. tdr.—15 HP. SK 230 v.
10 Ton Larry Car. 500/250 v. DC.
10 HP Fridy Car Puller, AC Motor.
4—10 Ton Chisholm Moore Chain Hoists.
2—Fairmont Car Retarders.
1—1 Ton AC Monorail 220/3/60.
4—2720 GPM 85' Le Courtney Bronze fitted 10".
1—700 GPM 60' Wheeler Bronze Fitted 5" Cent.
625 GPM 12' Hd. De Laval 10 HP 230 v. DC.
300 GPM 25' Hd. De Laval 1½ HP 230 v. DC.
300 GPM 44' Hd. De Laval 10 HP. 230 v. DC.
150 GPM 52' Hd. De Laval 5 HP 230 v. DC.

DC MOTORS, GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
1200KW	Al. Ch.	750	cpd.	500 v.
1500	West.	600	sh.	600 v.
300 KW	West.	1200	cp.	SK
175	G. E.	475	ser.	MD 109
150 KW	West.	1200	cp.	SK
130	G. E.	550	ser.	CO 1812
125	West.	450/1000	sh.	SK 193
100	G. E.	480	ser.	MD 108
60	West.	1750	sh.	SK 1207
50	Northern	600	ser.	K
50	G. E.	250/1000	sh.	RF16
50	Reliance	1750	cp.	166 T
40	G. E. (Vert.)	1750	cp.	CD 93
40	Roth	1500		
35	C. Wh.	700	sh.	CM
30	West.	1750	sh.	SK 93
25	West.	325/975	sh.	S
20	West.	1150	sh.	SK 63
15	West.	800	cp.	SK 93
15	Wh.	800	sh.	CM
15 (4)	C. Wh.	1400/1700	sh.	CM
13	West. (Enc.)	825	cp.	SK 113
10 (2)	G. E.	1750	sh.	CD
7½	G. E.	1750	sh.	RL
5	Reliance	1750	sh.	14T

AIR COMPRESSORS

1200 cu. ft. 100# Worthington 2 stage Belted.
750 CFM 100# Ch. Pa.—150 HP West. S. R.
173 cu. ft. 100# Pres. Chic. Pneu. Belted.
1—90 cu. ft. 100# Pres. Chic. Pneu. Belted.
1—75 cu. ft. 100# Chg. Pneu.-AC Motor.

AC MAGNETIC STARTERS (3 ph. 60 cy.)

2—700 HP West. 2300 v. Syn. Motor Starters.
1—125 HP. 440 v. Fan. reduced v. Comp.

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20 Ton Truck Scale	702.00
5 Ton Tipple Scale	312.00

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2½" Giddings & Lewis Horizontal Boring Mill.
2½" Giddings & Lewis Horizontal Boring Mill.
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SYNCHRONOUS MOTORS

3 PHASE, 60 CYCLE

Qu.	HP.	Make	P.F.	Volts	RPM.
1	30	Whse.	.8	220	1800
2	50	G.E.	.8	2200	660
1	60	G.E.	.8	440	1200
1	100	G.E.	.8	440	900
1	100	Whse.	1.0	2200	1200
1	125	Whse.	.8	220/440	1200
1	150	G.E.	.8	440	900
1	150	G.E.	1.0	2200	900
1	500	G.E.	.8	2200	720

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A. C. GENERATORS

Kva.	Make	P.F.	Volts	RPM.
25	Whse.	.8	220/127	1800
125	Whse.	.8	220/440	1200
200	C.W.	1.0	600	720
200	C.W.	.8	240	600

32 KW G.E. Frequency Converter, 220/3/60-Cy. to 110-V., 180-Cy.

SQUIRREL CAGE MOTORS

3 PHASE, 60 CYCLE

Qu.	HP.	Make	Type	Volts	RPM.
1	20	G.E.	IK	220	565
1	20	Whse.	CS	550	1740
8	20	Rel.	C504	440	
			1745/1150/875/570-RPM.		
2	25	Howell	M445	440	
			1770/1170/490-RPM.		
1	25	G.E.	KTR542	220	575
2	25	G.E.	KT332	220	865
1	25	G.E.	I-K	220	1200
1	30	Whse.	CS	550	900
1	35	G.E.	I-K	2200	1200
2	40	Al. Ch.	AR	440	860
2	40	F.M.	H12C	440	1200
1	40	Whse.	CS659A	2200	1760
1	50	G.E.	I-K	440	695
1	50	Whse.	CS	220	900
1	50	G.E.	KT536	440	1200
1	50	Ideal	AT445	440	1750
1	60	Whse.	CS607	440	800
1	75	Whse.	CS	440	1750
3	75	Al. Ch.	AR	2200	1765
1	100	G.E.	I-K	2300	695
5	100	F.M.	HS201C	440	880
2	100	Whse.	CS760	2300	1170
2	125	CW	126Q	440	430
2	125	Al. Ch.	AR	440	435
1	125	Whse.	CS761C	440	1800
3	125	Al. Ch.	AR	2200	1750
2	135	G.E.	KF542	440	1200
1	150	G.E.	I-K	2200	720
1	250	Whse.	CS	2200	1200

SLIP RING MOTORS
CONSTANT DUTY

3 PHASE, 60 CYCLE

Qu.	HP.	Make	Type	Volts	RPM.
2	5	Al. Ch.	ARY	220/440	720
2	10	G.E.	IM	220	1150
2	15	G.E.	IM	220	1150
1	20	G.E.	MT326	220	850
2	25	G.E.	MT332	550/2200	850
1	25	Al. Ch.	ARY	2200	860
4	25	G.E.	MT332	440	900
2	25	Whse.	CW481	440	1750
1	30	Al. Ch.	ARY	440	900
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	550/2200	435
3	40	G.E.	MT346	550	560
1	40	Whse.	CW644	220	870
3*	40	G.E.	IM	600	1170
1	50	Al. Ch.	ARY	2200	490
2	50	G.E.	MT336	2200	1200
1	75	G.E.	MT548	440	1200
1	75	Al. Ch.	ARY	440	1750
1	100	G.E.	MT356	440	865
1	125	G.E.	MT558	2200	900
1	150	G.E.	IM	2200	1750
1**	200	G.E.	IM	2200	580
1	200	Whse.	CW873	440	1175
1	250	Whse.	CW1106	2200	580
1	300	G.E.	MT412	2200	360
1	300	Al. Ch.	ARY	2200	514
1	300	G.E.	IM	2200	1200
1	400	Whse.	CW1108	2300	500
1	400	Al. Ch.	ARY	550/2200	514
1	800	Al. Ch.	ARY	2200	440
1***1200		Whse.	CW	2200	590

*—40-Cycle. **—3-Bearing. ***—Mill Type.
Will supply with any of these motors Primary Control (O.C.B. or Mag.) Sec. Control, Drum or Mag., with necessary Resistance.

TRANSFORMERS

OIL COOLED

Qu.	K.V.A.	Make	Voltage	Ph.	Cy.
1	25	Al. Ch.	2300/460/230	1	60
3	25	G.E.	2200/1100/608	1	40
3*	37½	Whse.	460/230-230/115	1	60
2	50	Wag.	13200/11880-575/287	1	60
1*	110	El. Fur.	2300-110/94/62/55	1	60
5	130	G.E.	1900/9500-550/2200	1	60
6	165/247	G.E.	38100/22000/11000-430/215		
				1	60
1	200	Whse.	3810/2200-440	3	60
3	300	Whse.	2400-480/240	1	60
1	500	G.E.	2400/240	3	60

*—Air-Cooled.

MOTOR GENERATOR SETS

3 PHASE, 60 CYCLE

Qu.	KW.	Make	RPM.	D.C. Volts	A.C. Volts
1	5½	G.E.	1800	250	440
1	9	G.E.	1800	250	440
1	15	Al. Ch.	1200	250	440
8	25	Whse.	1200	120/240	440
4	25	Whse. (3-U.)	1200	120/240	440/2200
2	35	G.E.	1800	125	440
1	50	Lo. Al.	1200	120/240	440
1	75	Whse.	1200	125	440
2	94	G.E.	1200	60	440
1	100	Al. Ch.	900	125	2300
1	150	Rel.	1200	250	2300/4100
1	200	G.E.	1200	250	2300/4000

3-U.—3-Unit Set.
ABOVE FURNISHED COMPLETE WITH D.C. PANELS AND A.C. CONTROL EQUIPMENT.

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2—12 AA Goodman 250 Volts
1—11 2 G3A Goodman 220 Volts
2—12 A and 12 AB Goodman 250 Volts
4—CE 7 Sullivan AC and DC

LOCOMOTIVES

1—Elec. Hoist, 40 H.P. Motor
1—6 ton Westinghouse 250 Volts
1—6 ton G-E 250 Volts
1—6 ton Goodman type 2600 250 Volts

LOADING MACHINES

1—7 BU Joy 250 Volts 42" gauge
2—5 BU Joys 250 Volts 42" gauge

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AIR COMPRESSORS

2—175' CFM Inger.-Rand 2 cyl. vert. 150 P.S.I. Type XIV, dir. con. to G.E. 50 HP, DC, motor, 230 V., 400 RPM. Mounted on factory cast iron base. Complete with intercooler, unloader and accessories.

2—1,500 CFM Penna. 110 P.S.I. horiz. 2-stage, Class DCE-2, with direct motor drive, 300 HP, Elec. Mach. syn. motor, 3 ph., 60 cy., 2,300 V., 225 RPM, with intercooler and aftercooler and accessories. Request Bulletin D-100 for other compr. in stock.

PHILADELPHIA TRANSFORMER CO.

Box 566 — Dalton, Pa.

NEED A TIPPLE QUICK???

Modern steel tipple available for quick delivery. All component parts dismantled and ready for loading on railroad cars or trucks.

Heavy duty six feet wide double leaf balanced shaking screen with eccentric drive, shaking picking tables for lump and egg sizes, scraper type hinged loading booms with rescreen area, reciprocating plate feeder and hopper, etc., all supported by steel structure of heavy construction. Designed and built by Link-Belt.

Originally operated as three track plant, but nominal additions will change over to four or five track plant. Capacity 350 tons per hour.

Our engineers have personally inspected this offering and we recommend it to any operator requiring immediate railroad loading facilities for three to five tracks.

For further particulars write, wire, or phone.

Templeton-Matthews Corp.

Sycamore Bldg., Terre Haute, Ind.

NEW MOTORS

In Stock—Immediate Shipment

3 — 5 — 7½ — 10 and 15 h.p.
1,200 and 1,800 r.p.m.

220/440 volt, 3 ph., 60 cy., BALL BEARING, Type AR Allis-Chalmers Sq. Cage Induction Motors.

REBUILT ELECTRICAL EQUIPMENT

Motor-generator Sets and Rotary Converters; Motors; Control; Transformers, etc.

R. H. Benney Equipment Co.

5024 Montgomery Road, Norwood 12, Ohio

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS—250 v. D.C.
(Motors 220/440 or 2200 v., 3 ph., 60 cy.)

No.	KW.	Make	Speed
1	500	Allis Chal.	1200
1	200	G. E.	1200
1	175	West.	1200
1	150	Ridgway	900
1	125	Allis Chal.	1150
1	110	Westg.	700
1	100	Allis Chal.	1150
2	75	G. E.	1750
1	50	Ridgway	1200
1	50	Ideal	1750
3	40	West.	900
1	30	West.	1200
1 New	25	Burke	1800

D.C. GENERATORS — 250 v. D.C.

No.	KW.	Make	Speed
2	300	Ideal	1200
6	250	West.	1200
1	250	Allis Chal.	1200
1	175	G. E.	700
3 New	135	G. E.	1150
1	125	West.	560
1	125	Allis Chal.	1150
1	110	West.	700
1	100	Allis Chal.	1150
1	75	West.	750

A.C. GENERATORS—2200/4000/440/220 v.

No.	KW.	Make	Speed
1	125	West.	257
1	450	Elec. Machy.	120

D.C. MOTORS—230 volts

No.	H.P.	Make	RPM.	Type
1	175	G. E.	550	MD
3 New	150	G. E.	875	CDM
2	150	Star	1800	F-92
3 New	133	G. E.	875	CDM
1	125	Allis Chal.	850	E. R.
1	80	West.	450	——
3	40	West.	625	MC
3	40	Cr. Wh.	1700	CM
1	30	Cr. Wh.	1750	CMC
1 New	25	West.	600	SK-113
1	25	F. M.	950	CP
1	25	West.	1100	SK

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

456—New 1 HP. Cutler Hammer across the line.
111—New 1 HP. Cutler Hammer across the line.
30—New, 2 HP. Cutler Hammer across the line.
55—New 5 HP. Cutler Hammer drip proof. 2 step current limit OL and LV.
58—New 7½ HP, Cutler Hammer.
60—10 HP. Cutler Hammer Magnetic.
12—10/15 HP., 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
9—New 10/15 HP., 230 v. G.E.
10—New 20/35 HP., 220 v. Ward Leonard Magnetic.
10—New 40 HP., 230 v. G.E. Magnetic.

A.C. MOTORS—4000/2200/220/440 V.—3-Ph., 60 Cy.

No.	HP.	Make	Rpm.	Type
1	500	Elec. Mach.	120	Syn.

CONVEYORS

3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill complete with motor equipment with 250. DC. motors.

PUMPS with A.C. or D.C. MOTORS

Qua.	Gpm.	Head	Kind	Make
3	1200	309	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	336	Cent.	Worthington
3	900	365	Cent.	Worthington
3	800	378	Cent.	Worthington
3	800	150	Cent.	Worthington
3	735	161	Cent.	Worthington
3	665	168	Cent.	Worthington
3	600	182	Cent.	Worthington
1	600	105	Cent.	Dayton Dowd
1	600	100	Cent.	Morris
1	532	189	Cent.	Worthington
1	500	115	Cent.	Dayton Dowd
1	500	123	Cent.	Morris
1	450	40	Cent.	Gardner Denver
1	400	50	Cent.	Dayton Dowd
1	400	140	Cent.	Morris
1	335	60	Cent.	Dayton Dowd
1	300	145	Cent.	Morris
1	300	125	Cent.	Dayton Dowd
1	244	60	Cent.	Dayton Dowd
1	210	60	Rotary	Nat'l Transit
2	200	125	Cent.	Worthington
1	200	72	Cent.	Morris
1	200	125	Cent.	Dayton Dowd
2	180	150	Cent.	Worthington
8	180	10	Cent.	Allis Chalmers
8	170	12	Cent.	Allis Chalmers

LOCOMOTIVE MOTORS

3—Westinghouse MH-58 36 H.P., 500 v., 430 rpm.

"Write for Stocklist"

HOISTS or WINCHES

200—1½-ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.
1—22,500 lbs. Rope Pull 37.5 fpm Electric driven Winch or Car Puller, Stephens Adamson complete with 10:1 Ratio Speed Reducer, 750 ft. 1" dia. steel wire rope belt driven by 25 HP. A.C. or D.C. Motor.

CAR PULLERS

100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.
1—Stephen Adams Car Puller, 1" dia. cable 10:1 with 25 A.C. or D.C. Motor.

TRANSFORMERS

20—NEW 25 kva., 460 v. pri. 230/115 v. sec. 1 ph. 60 cy. Allis Chalmers.

COMPRESSORS

1—315 CFM. Ingersoll Rand Portable, 100 lbs. pres., driven by 105 HP. Waukesha Oil Engines, 860 rpm.
10—240 CFM Westinghouse 3 cyl. vert. 150 lb. pres. with dir. con. 54 H.P. Westinghouse slipring Mtrs. 220/440/3/60 Automatic Unloaders.

STORAGE BATTERY LOCOMOTIVE

2—4-ton Goodman type M with Edison 63-G-18 battery with 2 motors, 11 hp., 80 v. with double reduction gear, speed 3½ MPH. 2,000 lbs. draw bar pull. Spare set of batteries and battery box, also spare parts.

ENGINE GENERATOR SETS

6—New 1 kw., Homelite portable, 14.25 Gas
3—New 1½ kw., Homelite, 115 v. 1 ph., 60 cy. portable Gas
3—1½ kw., Homelite, 14.25 v. D.C., portable Gas
6—2 kw. NEW Homelite, 28.5 v. D.C. Gas
3—5 kva. 120/240 v., 1 ph., 60 cy., dir. con. to 6 HP. Witte DIESEL
2—10 kw., 120 v., D.C. 1200 rpm., dir. con. to Hercules Diesel
3—New 25 kw. 120/208 v. 3 ph. 60 cy. Westinghouse dir. con. to 4 cyl. 70 HP. Lerol Gas Engine
2—30 kw. G.E. 125 v. Buda DIESEL
1—35 kw., Ridgway 220/3/60 Steam
2—30 kw., 110/220 v. 60 cy. 1200 rpm Rogers DIESEL
10—100 kw. 250 v. D.C. Superior DIESEL.
1—125 Kva., 220 v., 3 ph., 60 cy., Erie Ball STEAM

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

Montrose — 5800

FOR SALE

CRUSHERS

1—Stephens Adamson 30x30 double roll crusher. Will crush from 2" down to 1¼".
1—Link Belt 36x60 double roll crusher, equipped with gear drive.
1—American Pulverizer crusher, ±1627. Type AC, machine number AC3B, crushes from 20" down to ½".
1—Jeffrey single roll crusher, size 36x36, No. 4507. Will crush maximum lump of 20" at rate of 250 tph to a product of 1¼" when operating at 300 rpm. Direct connected by flexible coupling to 75 HP. GE motor, 3/60/440, speed full load 885, ball bearing, fan cooled.

FAN

1—Bayley ±17, Plexiform fan, type F, wheel dia. 93⅛" circumference, 24.478 ft. outlet area, 39.376 sq. ft. Capacity ranges from 39.376 CFM at outlet velocity of 1,000 to 141,759 CFM at outlet velocity of 3,000.

LOCOMOTIVES

1—4 ton Mancha Battery locomotive, equipped with Gould Batteries, 36" gauge.
1—4 ton Westinghouse locomotive, ball bearing 36" gauge, class 4-2-15-C-253.
1—5 ton Goodman locomotive, type W12A5, 42" gauge, 250 volts, DC.
1—6 ton Goodman locomotive, 36" gauge, 250 volts, DC.
1—6 ton Goodman locomotive, type 3304T, ball bearing, 36" gauge, 250 volts, D.C.
1—6 ton General Electric locomotive, classification LM2T6MM5. R86E type controller, 36" gauge, 250 volts, DC.
2—8 ton Goodman locomotives, ball bearing, 36" gauge, type 32AO4T.
1—10 ton General Electric locomotive, ball bearing, 36" gauge, 250 volts, DC.

MINING MACHINES

2—Sullivan type CH8, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3/conductor mining machine cable.
2—Goodman Universal mining machines, type 112G3, 36" gauge.
1—Jeffrey 35BB, AC shortwall mining machine, 6' cutter bars, complete with tip turn truck, cable and reel.
1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts, DC, 8' cutter bar.

MOTOR GENERATOR SETS

1—50 KW motor generator set, consisting of: 75 HP. Crocker Wheeler DC motor, compound wound, ±254053, 230 volts, 273 amps, type CCM, size 50H, connected to 75 HP. Westinghouse AC motor, 220 volts, 1,170 RPM, 3 phase, 60 cycle, 166 amps, type CS, ±1504169, complete with compensator for AC end, but no switchboard for DC end.
1—50 KW motor generator set, AC end, 2,200 volts, DC end 250 volts, complete with compensator, and switchboard. Perfect condition.

TIPPLES

1—5 track steel tipple complete with shaker. Capacity 2,500 tons per day.
1—Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

HOISTS

1—Ottumwa Iron Works single rigid cylindro-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage 6,000±, weight of car, 1,600±, weight of coal average 2,500±, total cage travel 277 ft. (HMD) size of rope 1⅛", trips per hour 78, rest period 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 440 volts, slip ring speed full load 700 RPM, complete with automatic switchboard.

Other types and sizes of hoists, with and without motors.

PUMPS

All sizes and types of pumps.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

for IMMEDIATE DELIVERY *of* RUBBER PRODUCTS

CONVEYOR BELTING, TRANSMISSION BELTING, ELEVATOR BELTING, FIRE, WATER, AIR, STEAM, SUCTION and WELDING HOSE.

CALL WIRE WRITE CARLYLE

THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

NEW GUARANTEED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers	Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices — Mention Size and Lengths.

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices — Mention Size and Lengths.

SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE

All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
¾"	25 feet	$4.25		35 feet	$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArclay 7-9793

MOTOR GENERATORS

500 KW GE. SYN., 575 V. 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

400 KW WEST. SYN., 575 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.

300 KW GE. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

250 KW GE. Syn., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM. Complete Manual Switchgear.

SYNCH. CONVERTERS

300 KW WEST., 575 V., 3 Ph., 60 Cy., 1200 RPM. Pedestal Type. 13200/6600/4000/2200 V. Transformers and Switchgear.

LOCOMOTIVES

10-T JEFFREY, 250 V., MH-110 Mts., 36-48" Ga.

10-T WEST., 250 V., 907-C Mts., 36"-44" Ga.

8-T WEST., 250 V., 906-C Mts., 42"-48" Ga.

6-T G.E., 250 V., HM-701 Mts., 22"-32" Ga.

6-T WEST., 250 V., 903-B Mts., 22"-30" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY

501 Grant Building, Pittsburgh, Pa.

FOR EVERY BUSINESS WANT

"Think Searchlight First"

We Offer

Subject to Prior Sale

One hoist manufactured by Vulcan Iron Works, Wilkes-Barre, Pa. Name plate No. 397, Vulcan, geared, electrically operated, hoist; equipped with two straight face grooved type drums, 6'-0" diameter, each with sufficient face for coiling 170 feet of 1⅛" wire rope, allowing three extra grooves on each drum for fastening; steel machine cut gears; gears of the single reduction herringbone type. Gravity actuated power released drum and rotor shaft brakes. Overwind and overspeed protection, complete with motor-driven compressor.

Diameter of drum shaft 10".

Diameter of main bearings 8"x16".

Pinion shaft—4⅞".

Pinion shaft bearings 4⅝"x12".

Rope speed—500 feet per minute.

MOTOR—General Electric Induction Motor, Model 97E143G-1, Frame 572, Type MT, 2,200 volts, 43.5 amperes, 3 phase, 60 cycle. Secondary—380 volts, 183 amperes. 150 HP, 350 RPM. Serial No. 5393652.

CONTROL EQUIPMENT—1 General Electric Switch Panel with 1—200 Ampere, 4,500 volt, 3-pole, Single Throw Oil Circuit Breaker, complete with operating mechanism overload trip coils and no-voltage release.

1—A-C Ammeter, 0-100 ampere scale.

1—3-phase Kilowatt-hour meter.

2—100/5 ampere Current Transformers.

2—20/1 Potential Transformers.

3—PQ-3 Overload Relays.

1—5 KVA, 2,200/220 volt Control Transformer.

1—General Electric Magnetic Reversing Panel, Type CR-7441-A1, 2,200 volts, 50 amperes, 3-phase, 60 cycle, complete.

1—General Electric Accelerating Panel Type CR7442-A1, 6 step acceleration panel, complete with resistance.

1—CR3012-C233G Master Switch (hand operated controller).

1—MS2H Emergency Switch.

1—CR2940-BS11B Maximum Torque Push Button.

If interested address

Post Office Box 30,

Bluefield, West Virginia

FOR SALE

Marion Diesel Power Shovel #331, Serial #7180. Crawler mounted, 22-foot boom, 18-foot stick, chain crowd, 1¼ yd. bucket, in splendid working condition, immediate delivery.

Major Equipment Company, Cambridge, Ohio

DE LAVAL PUMP

Solid bronze, sulfur proof, five-hundred gallon per minute, four-hundred feet height, excellent condition with a base.

Kottler's Auto Wrecking Co.

Box 154 Morgantown, West Virginia

CONVEYOR BELTS
ONE DAY SHIPMENT

1,675 ft. 36 in. 6 ply — New
1,120 ft. 36 in. 7 ply — Used
362 ft. 30 in. 6 ply — New
1,075 ft. 30 in. 5 ply — New
1,630 ft. 24 in. 5 ply — New
1,020 ft. 24 in. 4 ply — New
1,528 ft. 18 in. 4 ply — New

THE DARIEN CORP.

60 E. 42nd St., New York, N. Y.
Tel. Mu. 2-0042

MINING MACHINES

Jeffrey: 2—25B, 28A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 24B.
1—Joy Caterpillar truck for 29B or 29C.
Goodman: 12A, 12AB, 12AA, 12G3A, Shortfalls. 424, 24B, 124EJ Slabbers.
1—12G3, 220 volt and 2—17, 12DA 250 volt, 12 DA, 500 volt.
2—Permissible Type 12CA, 6—112AA. Motors for 212 G3—Volts 220. Phase 3.
1—Hitch Cutter for Cross Head timbers.
2—Goodman Slabbing Machines, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9, 220 Volt, 3 Phase.
1—CE7 machine, 250 v., D.C.

SUBSTATIONS — 275 volts, D. C.

1—150 KW. **G. E.** MG Set.
1—300 KW. **Westing.** Rotary. As is armature needs rewinding.
1—150 KW. **West.** MG Set.
1—100 KW. **Ridgway** MG Set.
1—200 KW. **H W** Rotary Converter.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton 8-30 36" gauge.
1—6 ton type 8A. 1—type 33.
1—5 ton type 42-0-4-2.
Westinghouse: All 250 volts.
906 motors and 102-904-115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G. E.: All 250 volt.
6 ton 803, 44" as is.
6 ton 823, 44".
6 ton 801.
8 ton 839.
1—8 ton type HM 61—36" ga.
6 ton 819-821.

LOCOMOTIVES

5 ton 825, 44" and 36".
8 ton 839.
2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12. Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28, 35BB, 35A, 29C, 29L, 35L.
Goodman: 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T.
General Electric: 801, 807, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 906, 102, 907, YR2, 115. Also 200 KW.
200 KW Westinghouse Rotary Converter Armature: 250 V. Bracket Type, 150 KW G.E., HCC Bracket Type.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Automat Loader: 1 Myers-Whaley #4.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners, 2 Sullivan, 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury Arc Light.
2 Loading Booms: 40'x5' with Picking Table.
Bond Welders: Resistance. 1 spot welder.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt, 600 amps.
Corcuit Breakers, Manual: 600 amps to 3,000 amps.
Clam Shell Bucket: 1¾ cubic yard.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x30", 24"x24", 36"x36", 30"x30", 18"x18", 12"x16".
Conveyors: Scraper type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators. A5 Drill, 3-60-220.
Drop Bar Supports: (Gooseneck) 29B and 29C.
1 Revolving head for 29C.
Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW.
Hoists:
Hoists: Overhead, AC 3-60-440 1 ton and 2 ton. Crabs and Room Hoists.
Lathes: 48"x14' with Taper Attachment and 3-60-220 Motor.
Loading Machines: Myers-Whaley.
2—Myers-Whaley #3 and #4.
Milling Machines, horizontal and vertical.
Mine Cars.
Mining Machine Trucks, one on catts.
Motors: Miscellaneous and 1—50 HP Fynn Weichsel, 1800 RPM, 220 Volt, Slipring or synchronous Crane type. 1—oilwell motor, 2 speed 575 and 1160-HP, 15' and 36', 440 volts. Slip Ring with control and pole changer and series motors.
Motor Starters and Controllers: AC and DC.
Plants: Diesel Power. Synchronous Motor Starters, full Magnetic Across-the-line, 3 phase, 60 cycle, 4-150, 4-100 Volts—2-200 H.P. and 6-250 H.P. Westinghouse starters, automatic, magnetic, reversible.
Synchronous motor starters and starters.
1—165 H.P. 440 volt with resistance for slip ring. Motors, 1—100 H.P. 250 v. D.C.
1—Bread mixer with AC motor.
Belting 400 ft. 25".
Pulley flat belt-V and conveyors.
Plants natural gas 300 H.P. with DC. Generators 250 volts and smaller sizes.
Pumps: Rebuilt and New.
R. R. Switches: 85# and 100#.
Slate Larry.

GUYAN MACHINERY COMPANY, Logan, W. Va.

SHOVELS - DRAGLINES - TRACTORS - DRILLS

Model 1055 P&H Combination 3-yard Shovel and Dragline. 28' boom, 19' stick, 3-yard dipper; dragline boom 90', 3-yard bucket, Buda diesel engine. Machine 1½ years old. Located New York State.

955 P&H Dragline. 80' boom, 3-yard bucket, D17000 Caterpillar engine. Located near Hazleton, Pennsylvania.

Model 1201 Lima High Lift Shovel. 42' boom, 32' stick, 2½-yard dipper, Waukesha-Hesselman engine. Rebuilt machine. Located in West Virginia.

Model 95 Northwest Dragline. 80' boom, 2½-yard bucket, Light Plant. Murphy diesel engine. Completely overhauled. Located near Hazleton, Pa.

585 Link-Belt Diesel Dragline. 70' boom, 2½-yard bucket, D17000 Caterpillar engine. Completely rebuilt. 1942 machine. Located near Hazleton, Pa.

54-B Bucyrus-Erie Combination 2½-yard Shovel and Dragline. 80' boom, extra 10' extension, 2½-yard dragline bucket, 2-yard Williams Clamshell bucket, Buda diesel engine, Kohler light plant. Machine available after March 10, 1948. Located in New York City.

54-B Bucyrus-Erie 2½-yard Standard Shovel. Buda diesel engine. Located near Hazleton, Pa.

802 Lima Diesel Dragline. 75' boom, 2¼-yard bucket, Waukesha-Hesselman engine. Located near Hazleton, Pa.

Osgood Chief 2-yard Shovel. D17000 Caterpillar engine. Located in Eastern Pennsylvania.

955 P&H Combination 2-yard Shovel and Dragline. 70' dragline boom, 2-yard bucket; 26' shovel boom, 18' stick, 2-yard dipper Buda diesel engine. Located in New York State.

Model 3000 Manitowac High Lift Shovel and Dragline. 35' boom, 27' stick, 1¾-yard dipper, 85' boom, 1¾-yard bucket. 1946 machine. Located West Virginia.

Osgood Victor 1¾-yard Combination Shovel and Dragline. 23' boom, 18' stick, 1½-yard dipper, 60' drag boom, 1½-yard bucket, D13000 Caterpillar engine. Located in Central Pennsylvania.

Model 77 Lorain Shovel, 1½-yard dipper, D13000 Caterpillar engine. Machine is one of the last 77's built. Located near Hazleton, Pa.

Model 6 Northwest 1½-yard Shovel. Murphy diesel engine. Located New York.

Model L-55 Lorain 1-yard Shovel. Waukesha-Hesselman gas engine. Completely overhauled.

342 Marion Combination 1-yard Diesel Shovel and Dragline. Used nine months. Located West Virginia.

Northwest Model 25 Diesel Shovel. Perfect condition. Used less than 1,000 hours. Available at once. Located North Carolina.

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Osgood General ¾-yard Shovel with Buda Diesel Engine. Completely rebuilt. Located near Hazleton, Pa.

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Model 44 Loomis Clipper Blast Hole Drill with New Hercules Engine. Located near Hazleton, Pa.

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8—100-ton, 45-ton, 30-ton Diesel Locomotives.
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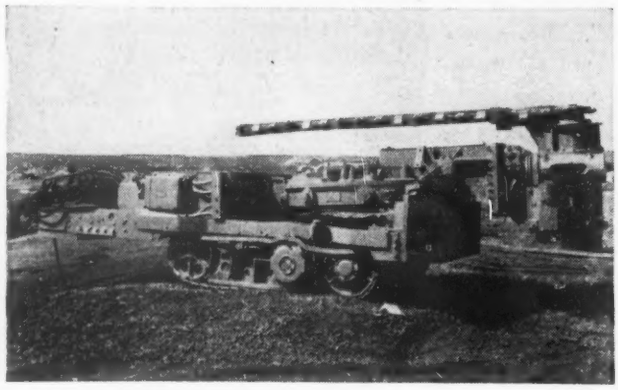
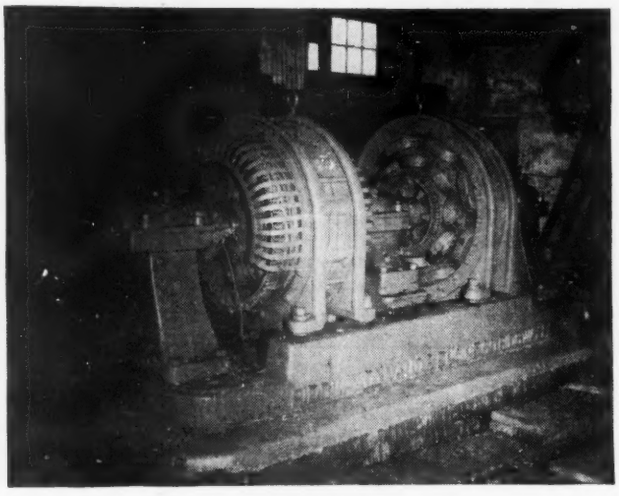


Jeffrey Arcwall 29 L-E Mining Machine



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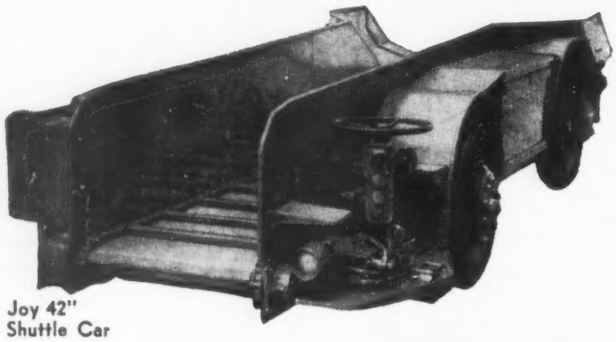
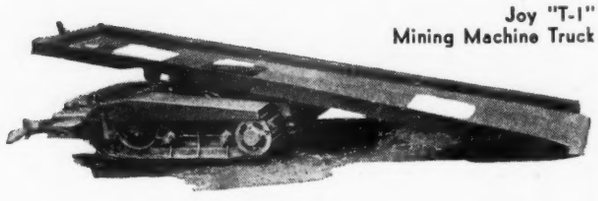
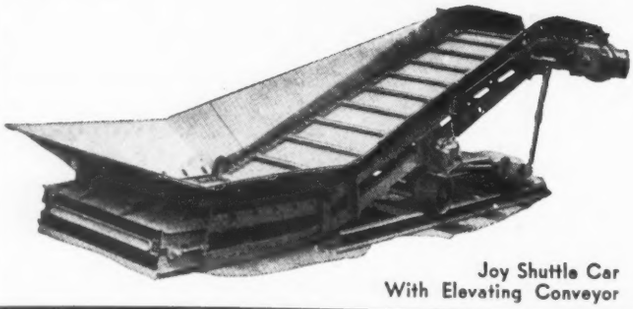


Joy 42" Shuttle Car

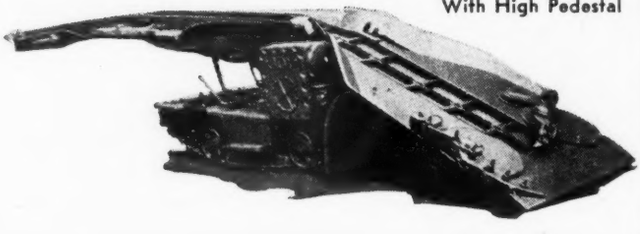
Joy "T-1" Mining Machine Truck





Joy Shuttle Car With Elevating Conveyor

Joy 7-BU Loader With High Pedestal



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THE COLUMBINE MINE EQUIPMENT CO., INC.

1669 BROADWAY, DENVER 2, COLORADO

SEE PAGE 197 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

COMPLETE LIQUIDATION

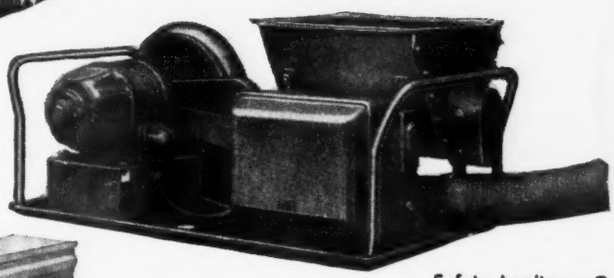
IMMEDIATE DELIVERY

... Three and one-half million dollars in new and nearly new coal mining machinery and equipment

Rear View

GOODMAN TYPE 112 SHORTWALL COAL CUTTER

Front View



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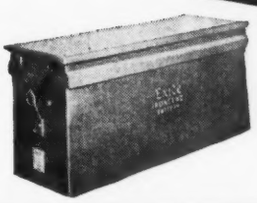

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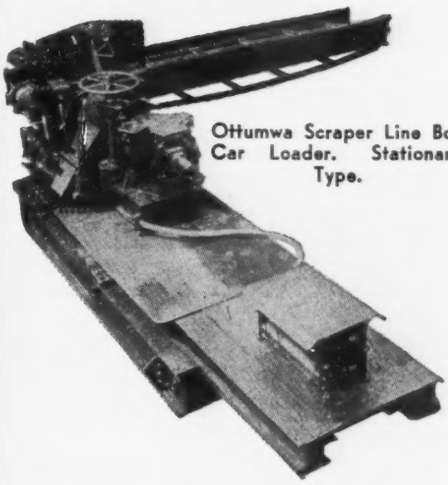
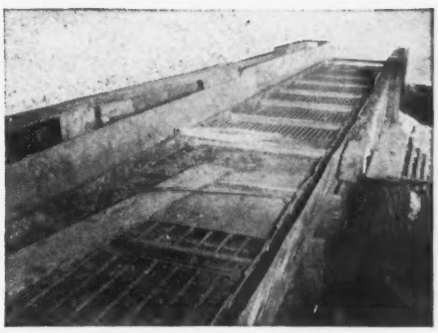


Ottumwa Scraper Line Box Car Loader. Stationary Type.



Partial View of Tipple with Grizzlies and Picking Screen.

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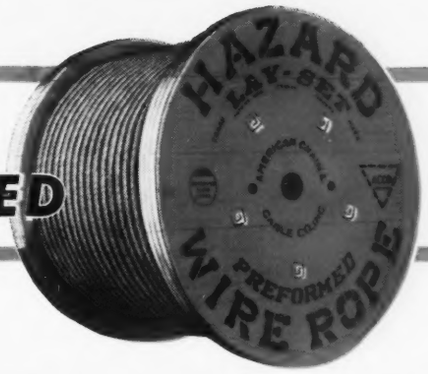
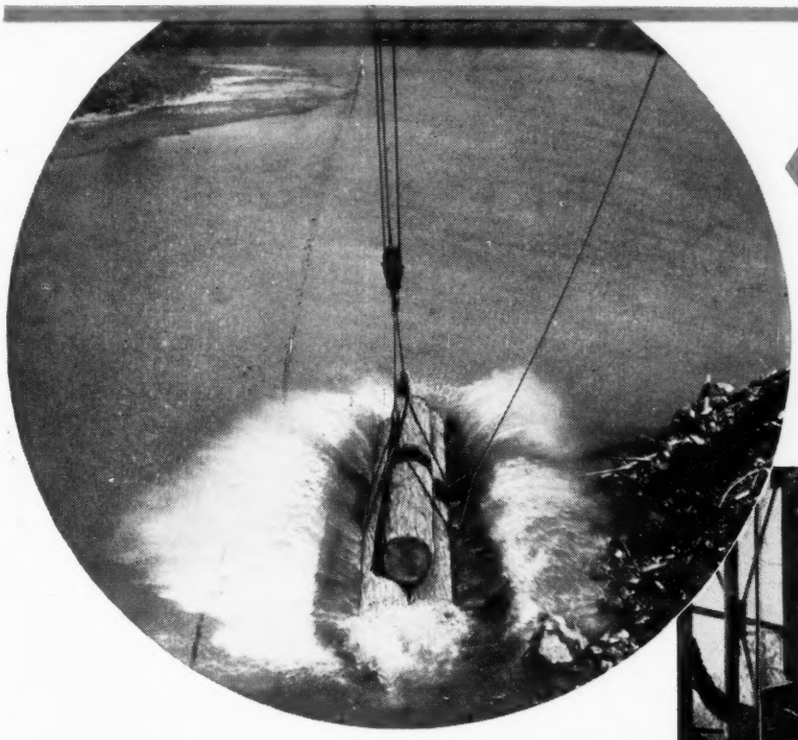
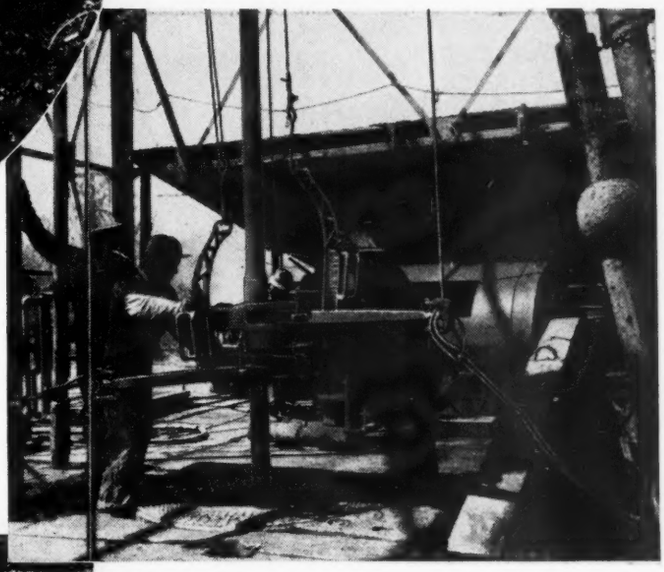
Improving Production with LAY-SET PREFORMED





Dropping logs into the river with a swing boom unloader. When logs hit water an automatic trip on the hooks frees the mainline straps. Buoyancy of logs in water slacks the mainline, and weight jerks hooks free from strap loops. With a load of 5,000 board feet (40,000 pounds), that's a lot of lifting, jerking and quick-slackening for the wire rope—but Hazard LAY-SET Preformed takes it in stride.



In oil drilling—Improved production with LAY-SET Preformed wire rope is quickly evident in the oil fields. Because LAY-SET is a "relaxed" wire rope, it takes bending stresses, whipping and straining—with ease. The result is fast, uninterrupted production—more barrels of oil per day.

Short wall cutting machine at work in a coal mine. Here, where wire rope failures would seriously affect production, operators depend upon LAY-SET Preformed wire rope. Its longer life means steadier, more profitable production.

***LAY-SET** Preformed wire rope will improve production on your lifting and pulling jobs too. Be sure to specify* LAY-SET Preformed *the next time you need wire rope.*

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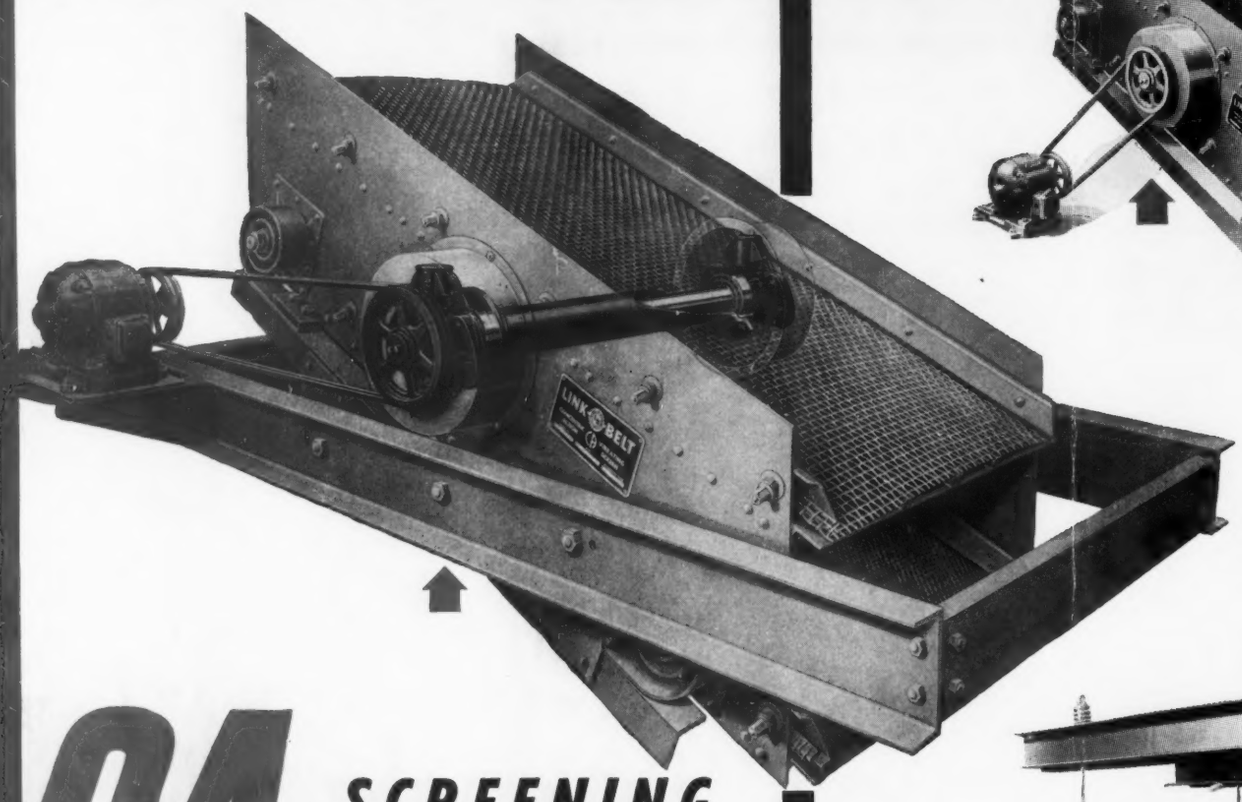
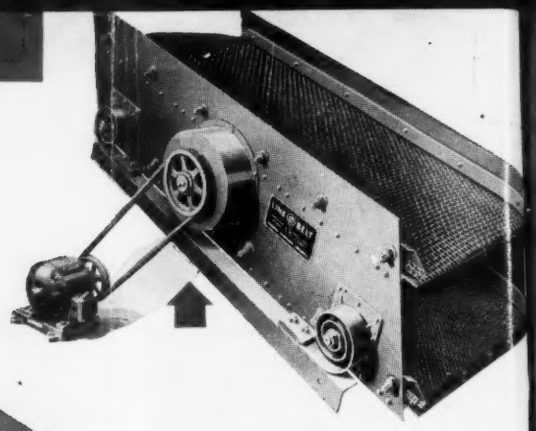
Concentric Action Vibrating Screen





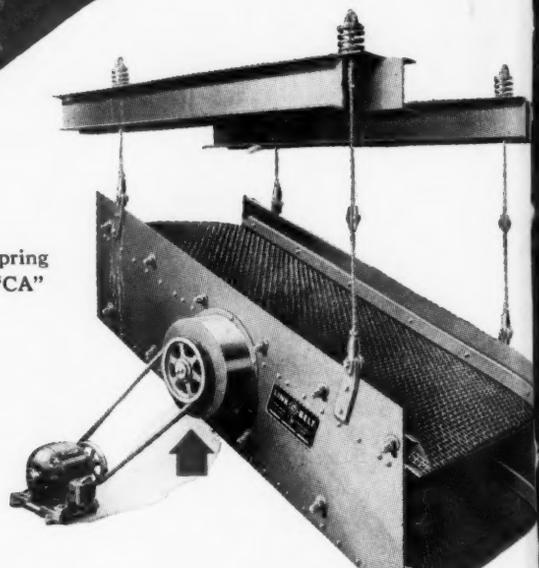
Above: Basic floor mounted, with steel support members.

Left: Floor mounted adjustable slope with sub-frame and motor support.

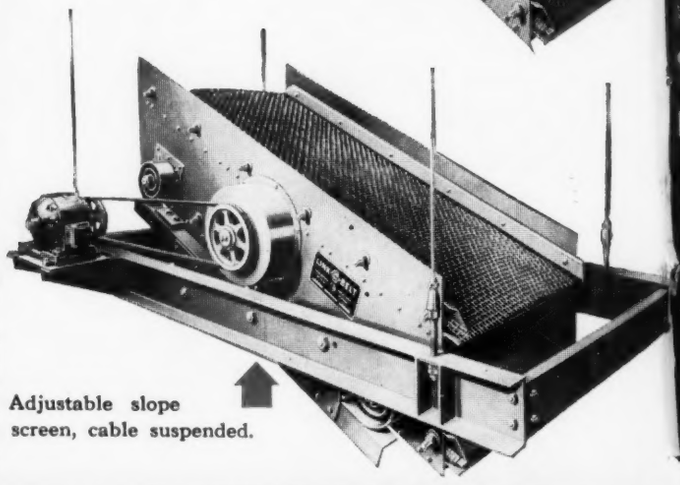
CA SCREENING COST CUTTER

The performance of the new Link-Belt Concentric Action vibrating screen in the field continues to surprise those who have seen it in operation. The "CA" unit, which imparts a concentric or circular vibrating motion to all parts of the screening surfaces, sets up new standards of efficiency and capacity as shown by: extreme smoothness in starting and stopping . . . superior performance on overloads . . . increased amplitude at high speeds permitting increased capacities . . . screen cloth tension easily controlled . . . unobstructed screening surface. The "CA" screen is easily inspected and serviced. Speed and amplitude can be changed in the field to suit screening conditions. Field adjustment of slope can be made without altering supports on all models except basic floor mounted.

The illustrations show the flexibility of mounting. For technical details write for Book No. 2154.



Cable and spring suspended "CA" screen.



Adjustable slope screen, cable suspended.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

10,969

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